

DL3800E

Inverse Multiplexer

User's Guide

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Industry Canada

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- European harmonized standards 73/23/EEC/, 91/31/EEC, 89/336/EEC, 93/68/EEC, and 91/263/EEC
- UL 1950 3rd Edition
- CAN/CSA C22.2 No. 950-95
- Comision Federal de Telecomunicaciones (Mexico)
- CISPR 22 Level B (EN 55022)




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Preface

The DL3800E Inverse Multiplexer User's Guide provides the information you need to install, test, operate, and manage the DL3800E Inverse Multiplexer.

AUDIENCE

This guide is prepared for network managers and technicians who are responsible for the installation of LAN-to-WAN equipment, and who are thoroughly familiar with the network topology in which the DL3800E Inverse Multiplexer is expected to operate.

ORGANIZATION

[Chapter 1, "Quick Install Guide,"](#) provides a concise installation procedure for most applications.

[Chapter 2, "Introduction,"](#) provides a description of the DL3800E Inverse Multiplexer system architecture, a discussion of features and benefits, and a sample application.

[Chapter 3, "Installation,"](#) provides guidelines for placing and securing the DL3800E Inverse Multiplexer in the operation site. Use this chapter to find out about command tools, system access, and basic configuration.

[Chapter 4, "Terminal Interface,"](#) shows how to monitor and manage the DL3800E Inverse Multiplexer using a VT100 terminal.

[Chapter 5, "Front Panel Interface,"](#) shows how to monitor and manage the DL3800E Inverse Multiplexer using the front panel.

[Chapter 6, "Diagnostics"](#) provides guidelines for troubleshooting the DL3800E Inverse Multiplexer.

[Appendix A, "Specifications,"](#) provides the electrical, physical, and networking characteristics of the DL3800E Inverse Multiplexer.

[Appendix B, "Pinouts,"](#) details connector and pin assignments for the DL3800E Inverse Multiplexer.

[Appendix C, "Factory Default Settings,"](#) lists factory defaults for the DL3800E Inverse Multiplexer.



CONVENTIONS

This section describes the formats used to differentiate specific types of information throughout Quick Eagle Networks user guides.

Symbols

Symbols denote text that requires special attention. The information contained alongside a symbol corresponds to one of four levels of severity:



NOTE: Follow guidelines in this, or the previous, paragraph to use the Quick Eagle Networks product more effectively.



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WARNING: Follow the instructions in this, or the previous, paragraph to avoid personal injury.



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Typeface or Symbol	Purpose	Example
Courier Font AaBbCc123	The names of commands, files, and directories, as well as on-screen computer output.	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. machine_name% You have mail.
Courier Font, Bold AaBbCc123	The input you provide, as contrasted with on-screen computer output. Keystrokes that you must provide to use the application.	machine_name% su Press Ctrl-L to refresh the screen.
<i>Palatino Font, Italic AaBbCc123</i>	Command-line placeholder that you replace with a real name or value. Book titles, new words or terms, or words that need to be emphasized.	To delete a file, type rm filename Refer to Chapter 6. These are called <i>class</i> options. You <i>must</i> be logged in as root to access this directory.
▼ Zapf Dingbats Font	Symbol that denotes a single-step procedure or task. Procedures requiring more than one task are numbered.	
<u><i>Palatino Font, Bold Blue, Underscore AaBbCc123</i></u>	Hyperlinks in the table of contents. When viewing the Portable Document Format (PDF) version of this user guide, you can click on one of these to jump directly to the selected subject matter.	
Palatino Font, Blue AaBbCc123 or AaBbCc123	Hyperlinks throughout general text.	
Helvetica Bold	Denotes actual markings on front or back panels.	Attach the cable to the TERMINAL port



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2. **Package the unit carefully and, before sealing the shipping carton, include any information you can provide about the problems you are currently experiencing with the unit.**
3. **Attach an address label to the shipping carton. Be sure to include the ERA number:**

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Quick Eagle Networks
217 Humboldt Court
Sunnyvale, CA 94089
ERA # _____



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Date	Issue Rev.	Description	Pages Affected
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January 1999	B	Update & Misc. Changes	All
January 2000	C	Update & Misc. Changes	All
September 2000	D	Update & Misc. Changes	All
October 2000	E	Update & Misc. Changes	All
June 2001	F	Update & Misc. Changes	All



1

Quick Install Guide

PURPOSE

This chapter is a quick reference for the setup and configuration of the DL3800E Inverse Multiplexer (see Figure 1-1). Please note that not all configuration items will be discussed, because this chapter only serves to get you up and running.

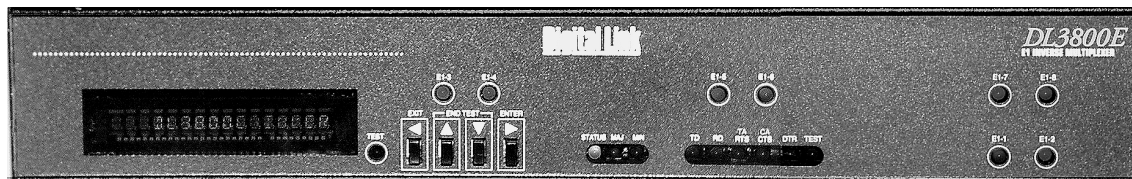


Figure 1-1 DL3800E Inverse Multiplexer (front panel)

CONFIGURATION

Equipment Needed

- Terminal or PC, with DE-9 port, that will emulate an ANSI VT100
- DL3800E E1 Inverse Multiplexer product (various ports)
- The DL3000E comes either with BNC or 120 ohm
- DE-9 cable (plug-socket) 154-00050-01 (Model DL1081) or equivalent.
- DA-15 (plug) to RJ-48 (plug) for E1 connections 155-00011-01 (Model DL1033) or equivalent.
- HSSI or 155-10082-01 (HSSI) (Model DL1404-10) or equivalent
- M-34 to DB-25 cables (v. 35) or 155-00903-01 (v. 35) (Model DL1300-10, or equivalent
- DC-37 to DB-25 (RS-449) 155-00902-01 (RS449) (Model DL1302-10) or equivalent
- X.21+DB-25 (X.21) 155-00907 (DL1314-10) and 155-00907-12 (DL1314-50) (Model ID1314-10 and -50) or equivalent

Setup

Terminal Log On

Connect your terminal to the **COMM** port on the back of the DL3800E unit. Before you can log into the unit, you must make sure that terminal settings match the DL3800E. Defaults for the DL3800E unit **COMM** port: 9600 baud, no parity, 8 bit word length, 2 stop bits. To log into the unit, first press **Ctrl-x** five times (that is, hold down the control key on the keyboard and press the x key five times. This gives you the unit number. Now type **Ctrl-x # Unit Number** and press **Return** or **Enter**. When prompted for user name and password press **Return** twice, and the Main Menu on the DL3800E unit should appear. The default unit number is 0.

Terminal Configuration

Change only the configuration items listed below. Leave the other options at the factory default settings. To make a change, note that you must press the UP and DOWN ARROW keys to highlight the item, press the **space bar** until the desired option displays, then highlight **CONFIRM** and press **Enter** before exiting the menu.

Unit Configuration

Select Configuration from the Main Menu. Select Unit Configuration. Set the time and date. Set unit number other than zero. Select Confirm, then select **EXIT** to go back to the CONFIGURATION MENU.

DTE Configuration



WARNING: V.35/RS449/X.21 will only work at a higher data rate with a DTE that can give terminal clocking, when in SCTE mode.

Configure the DTE interface for either v. 35/RS449/x. 21 or HSSI. For V.35/RS449/X.21 configuration, set the clock to SCTE and Normal TD/RD clock. Set the DTE loss condition for NONE. Select Confirm, then select **EXIT** to go back to the CONFIGURATION MENU.

Network Configuration

Set up a port for each E1 line you plan to use. Set Alarm to Report. Set ACTIVE/RESTORE MODE to Use w/auto restore. Normally is CRC4 enable. Primary clock Xmt=Network (assuming carrier or remote unit providing timing). Primary clock RCV should be set to AUTO. Configure SER to Immediate Confirm and select EXIT. Select Exit again to the Main Menu.

Save Configuration

Select SAVE CONFIGURATION from the Main Menu.

You're done! If you have any questions, please feel free to call Quick Eagle Network's Technical Support at (408) 745-4200.

SYSTEM OVERVIEW

The DL3800E Inverse Multiplexer bridges the gap between E1 and E3 data services by providing E1 multiplexing of multimegabit (up to Nx1.976 Mbps) DTE data onto two to eight E1 circuits. The DL3800E Inverse Multiplexer is an economical solution to bandwidth intensive applications as it provides multimegabit data transport without the need for E3 circuits. The DL3800E unit is an ideal solution for applications such as LAN-to-LAN internetworking, bulk data transfer, video teleconferencing, and disaster recovery.

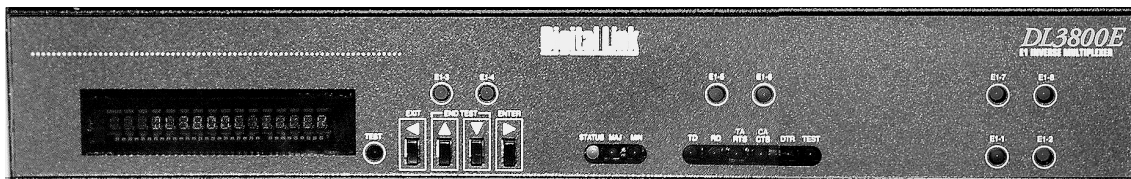


Figure 2-1 DL3800E Inverse Multiplexer

The inverse multiplexing technique employed by the DL3800E unit is completely transparent to the DTE application, as the multiple E1 circuits act as a single high-speed data link. The DL3800E unit can accept up to a 31-millisecond differential delay between individual E1 circuits, thus providing the capability to accommodate E1 circuits from divergent paths. This is often the case with circuits being utilized from different carriers.

An excessive delay alarm will cause an E1 line to be taken out of service. If the relative delay between all the E1 lines exceeds 31 milliseconds, then the E1 lines are removed from service one port at a time until the remaining group reside within the 31-millisecond window. The first port taken out of service will be the one that is farthest away from the average value, regardless of its relative delay value. In order to restore an E1 line, you must use the manual restore command. In order to bring an E1 line back into service, execute the manual restore command on the remote unit first. Then execute the manual restore command on the local unit. Auto restore will not work for lines removed due to excessive delay.

The DL3800E unit supports either High Speed Serial Interface (HSSI) or V.35/RS449/X.21 interfaces to the DTE.

The DL3800E unit features an automatic rate fallback in the event of a failing E1 circuit. If the performance of an E1 circuit is detected to be falling below accepted levels, the DL3800E unit automatically removes the E1 from service, and throttles back the DTE to a data rate corresponding to the remaining E1s. When the alarm condition on the affected E1 has been cleared, the DL3800E unit can automatically restore the E1 and data rate.

You can configure, control, and monitor the DL3800E unit through the front panel, an ASCII terminal (locally or remotely via a modem or remotely in-band) or a Simple Network Management Protocol (SNMP) management station. The remote DL3800E unit can be managed in-band using overhead in all active connections as the communications path. The DL3800E unit features an integrated SNMP agent which supports the E1 Management Information Base (MIB) in addition to a unit specific enterprise MIB.

A downloadable software feature of the DL3800E unit allows new features and functionality to be added to the unit on line (without interrupting the data) via the unit's built-in communications port, or via a selected E1 connection.

PRODUCT FEATURES

The DL3800E Inverse Multiplexer allows you to connect high-speed data terminal equipment (DTE) to multiple E1 links, providing aggregate data rates up to 15.808 Mbps. Utilizing up to eight E1 links simultaneously, the DL3800E unit is ideally suited to high bandwidth applications such as LAN-to-LAN internetworking, video teleconferencing, bulk data transfer and high-speed data recovery.

System Features

- High bandwidth data transmission over 1 through 8 E1 ports.
- HSSI or V.35/RS449/X.21 DTE interface
- Automatic Bandwidth response/recovery
- Local or remote management via front panel, terminal, or embedded SNMP agent
- Extensive diagnostics:
 - Front panel indicators
 - Built-in test loops
 - Automatic self test
 - Integral event log with nonvolatile memory

System Benefits

The numerous features of the DL3800E unit provide you with many benefits:

- Reliable, full performance access to E1 networks for the widest variety of DTE products
- Enterprise wide visibility via SNMP
- Local and remote access via front panel, terminal, or telnet
- Complete maintenance and diagnostic support via exhaustive alarm, statistic, and test capabilities
- Downloadable code provides for on-line upgrade to the DL3800E unit software for both major and minor feature enhancements

Application

The DL3800E unit accepts data from a high-speed bridge, router, front-end processor or other DTE device and multiplexes the bit stream onto one through eight E1 circuits for transmission at $N \times 1.976$ Mbps. Because the inverse multiplexing process is completely transparent to the attached equipment, the combined E1 circuits appear as a single high-speed data link to the DTE. The DL3800E unit accepts up to a 31-millisecond differential delay between individual E1 circuits, ensuring reliable operation in multiple carrier networks.

A unique feature of the DL3800E unit is the automatic bandwidth response to an E1 signal loss or network errors. If an E1 link falls below acceptable performance levels, the DL3800E unit removes the link from service and reduces the DTE data rate to correspond with the remaining E1 links in service. When the alarm condition has been cleared, the DL3800E unit restores the E1 link and increases the DTE data rate to its original level.

A typical application is shown in [Figure 2-2](#).

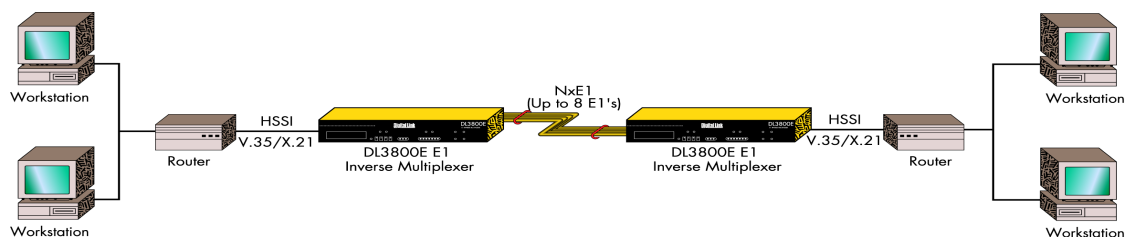


Figure 2-2 Typical Application for DL3800E

FUNCTIONAL DESCRIPTION

The base DL3800E unit configuration consists of a motherboard with two (E1) network interface connectors and the DTE connectors (HSSI and V.35/RS449/X.21). Six additional E1 network ports can be added with the addition of from one to three daughterboards, each daughterboard supporting two additional E1 ports.

The general operation of the DL3800E unit is explained in the following paragraphs which describe the signal flow and overhead functions.

Signal Flow

The DL3800E unit is configured by you for the number of E1 signals to be used for transmission. The DL3800E unit will provide a smooth clock to the DTE at the data rate required for the number of E1 outputs you have configured. For E1, this rate will be $N \times 1.976$ Mbps, where N is the number (1 to 8) of E1s to be used.

The transmit smooth clock PLL can use any of the incoming E1 clocks, an external clock, or internal clock as reference. The receive smooth clock will use one of the receive clocks at its source. The smooth clock VCO will be divided down to 8 kHz to be phase compared to the 8 kHz reference. The receive buffers are large enough to accommodate variations between E1 receive clocks.

The DL3800E unit supports one DTE interface. For data rates up to 6 Mbps, the DTE interface can be HSSI or V.35/RS449/X.21 (software selectable). For data rates over 6 Mbps, only the HSSI interface will be supported.

Data is sent from the DTE interface to an Inverse Multiplexer (IMUX) transmit framer. A 16-bit proprietary framing pattern is defined to satisfy the requirements of inverse multiplexing communications. This frame is constructed by using one payload bit in each frame for 16 consecutive frames. For E1, the inverse multiplexing frame is the first bit after the framing bit.

From the inverse mux framer, the data is sent to all E1 framers, where the E1 framing is added, and then to the appropriate E1 network interface and out over the E1 network.

All incoming configured E1 lines, with their respective clocks, are received into a standard E1 framer. The output of the E1 framer is fed into the IMUX framer.

Data coming into the DL3800E Inverse Multiplexer is stored in N independent buffers, where N is the number of configured input channels. From these buffers, the data will be read and IMUX framing removed.

When the incoming signal is framed on the inverse mux frame, the framer will start loading its Dual Port RAM. The address to the Dual Port RAM is derived from the 16-bit inverse mux frame. The software will ask all framers to latch their Dual Port RAM addresses at the same time, and by looking at the addresses, the software can determine which network has experienced the greatest delay.

From the receive inverse IMUX framer, the incoming data will go to the receive multiplexer. The net that is last in time will be enabled to tell the receive multiplexer when to start unloading the Dual Port RAM to the DTE interface. To allow for jitter and wander specifications, the read address counter will be positioned approximately three frames behind the write address for the network last in time.

E1 Port Crossover Detection

When the IMUX E1 circuits synchronize, they use the IMUX framing to communicate to know the ports (1-8). A crossover is a situation where a network line is connected to a port on the remote 3800E different from the port it originates from on the local 3800E.(e.g. port 1 on the local unit is connected to port 2 on the remote unit). This situation will cause DTE traffic to be incorrectly multiplexed and, as a result, severely errored.

When a crossover is detected, the DL 3800E removes the crossed port from the DTE data bundle and reduces the DTE data rate. The LED will change to flashing green and the port status in the Alarms & Status menu read "Line crossed", and also (Crossed to port:x), where x is the port number connected at the remote end. It also generates an SNMP alarm: `enCrossoverAlarm`.

When the crossover is cleared, the port is restored to DTE bundle and the LED restores to green. Port crossover status clears and the SNMP alarm `enCrossoverAlarm` is idled.

An IMUX E1 circuit is reestablished as soon as the mismatched circuits are disconnected and reconnected properly.

[Figure 2-3](#) is a functional schematic of the DL3800E unit showing a unit supporting four E1 lines.

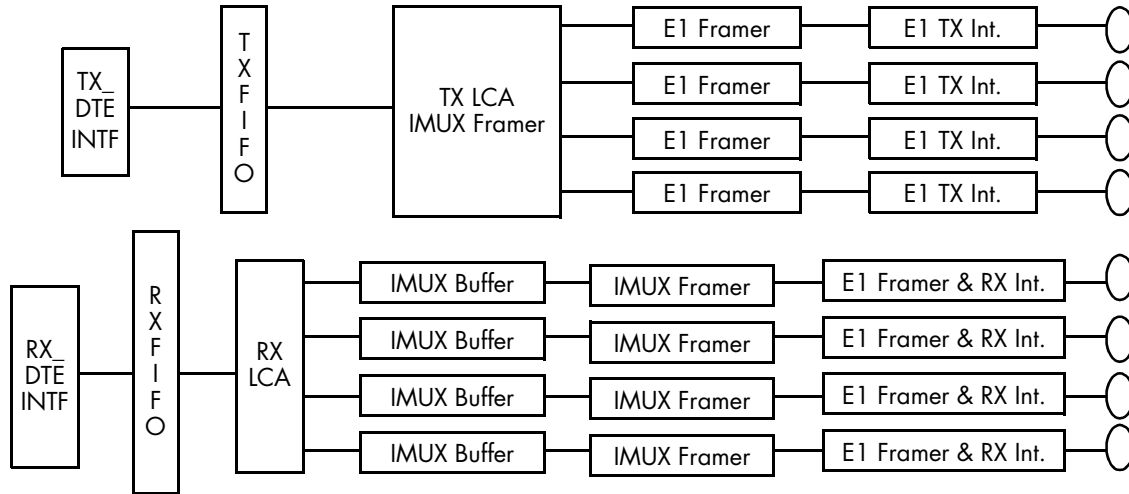


Figure 2-3 DL3800E Unit Functional Schematic

Overhead Functions

The overhead functions consist of a controller, front panel, two RS232 communication interfaces (terminal and network management), and a power supply.

The controller function is performed by a microprocessor on the main board. The controller collects E1 statistics. It also processes E1 alarms and performance monitoring information, as well as supporting unit configuration, test and maintenance activities. Finally the Controller block supports the front panel display, terminal port, and SNMP port interfaces.

The front panel consists of a 16-character vacuum fluorescent display, 4-key keypad, and LEDs. This panel can be used to provision the unit, run diagnostic tests, or access performance statistics.

The serial ports are RS-232C compatible ports with one port supporting a menu driven ASCII terminal interface, and the other port providing access to the built-in SNMP agent functionality.

The DL3800E unit can be ordered with DC or AC power supplies and the built-in power supply has a range of 110 to 240 VAC and -40 to -75 VDC.

3

Installation

INSTALLATION



NOTE: Before beginning the installation process, inspect the DL3800E unit for damage which may have occurred during shipment. If damage has occurred, notify Quick Eagle Networks and your package carrier immediately.

1. **Unpack and inspect the DL3800E unit for damage that might have occurred during shipment. If necessary, wipe off the exterior with a soft cloth. Save all packing slips and papers that come with the unit. Save the shipping cartons and packing materials until installation is complete and proper operation is verified.**
2. **Verify that all items ordered are included in the shipment. The shipment should consist of the following:**
 - DL3800E Digital Inverse Multiplexer
 - DL3800E User's Guide (this manual).
 - Appropriate data and network interface cables and connectors (if ordered).
 - Power cord
3. **Mount the DL3800E unit.**
See ["Mounting" on page 3-2.](#)
4. **Connect Power Cables and Connections.**
See ["Power Cables And Connections" on page 3-3](#)
5. **Connect network cables to the DL3800E unit.**
See ["E1 Network Connection" on page 3-5](#)
6. **Connect the DTE cable to the DL3800E unit.**
See ["DTE Cable And Connection" on page 3-5](#)
7. **ASCII Terminal and SNMP Connection**
See ["ASCII Terminal and SNMP Connection" on page 3-6](#)

8. Configure Unit

See “Unit Configuration” on page 4-17 (ASCII terminal)

a. Configure COMM PORT

See “Unit Configuration” on page 4-17 (ASCII terminal)

b. Configure NMS (Network Management) Port

See “SNMP Configuration” on page 4-39 (ASCII terminal)

9. Configure Network

See “Network Configuration” on page 4-25 (ASCII terminal)

10. Configure DTE

See “DTE Configuration” on page 4-20 (ASCII terminal)

MOUNTING

Rack Mounting

The DL3800E unit (Figure 3-1) is shipped with mounting ears for a 19- or 23-inch rack that are mounted for use with a 19-inch rack.

Desk Operation And Stacking

Four stick-on rubber feet are supplied with each DL3800E unit. Remove the covering and stick them onto the DL3800E unit bottom. You can now stack units as required on a flat surface in a well-ventilated, secure area.

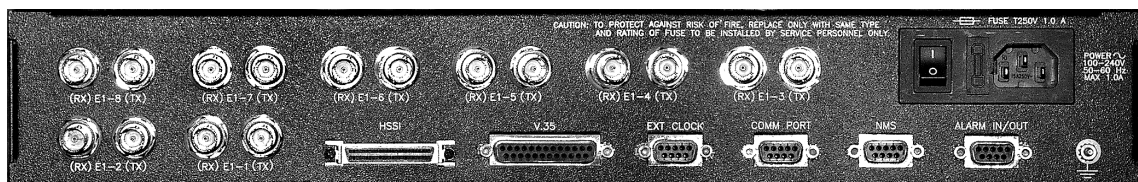


Figure 3-1 DL3800E Rear Panel



NOTE: On DC versions of the DL3800E, the AC receptacle will be covered with a DC face plate.

POWER CABLES AND CONNECTIONS

The DL3800E unit can be ordered with an AC or DC power supply.

AC Power Connection

An AC power cord is supplied with the DL3800E -AC-XXX to provide 120 to 240 VAC power. The power cord receptacle is located on the rear panel of the DL3800E-AC-XXX. For AC power, connect the AC power cord to the DL3800E-AC-XXX, and plug into the nearest AC outlet.

DC Power Connection

The Quick Eagle Networks DL3800E Inverse Multiplexer can also be powered by a -48 VDC power source. The DC power connection on the DL3800E is located on the back panel. There are eight screw terminals located on the rear panel. The two screw terminals on the far right (looking at the rear panel) are for DC power.

Connect the -48 V wire to the screw terminal labeled —. Attach the 48 V Return(+) wire to the screw terminal to the immediate right, labeled +. Connect earth ground to the ground stud.

When using DC power, you will need the following:

- A tray cable which must be UL recognized 14 AWG, 3 conductors, copper strand.
- Electrical power and control cable type TC, 600 V 90°C. (Alpha Wire Company No. 45443 is an example.)

To mechanically install the DL 3800E when using DC power, perform the following steps:

1. **Place the DL3800E unit on a flat surface or in a rack.**
2. **Before you connect the DL3800E unit to the centralized DC power source, strip 2.0 inches of jacket material off the tray cable and 0.5 inch of insulation off each wire.**
3. **Connect the -48 VDC wire to the - terminal (on the rear panel's terminal block, using a small flat screw driver (1/4-inch blade) to fasten the wire.**

4. Connect the ground (+) wire to the + terminal in the same way.



NOTE: The unit is designed to operate with negative voltage; therefore, you must connect the positive terminal to ground.

5. Connect the frame ground terminal to the local earth ground, if required.
 6. To minimize disturbance to the wires through casual contact, secure a tray cable near the rack frame using multiple cable ties. Use at least four cable ties, a minimum of four inches apart. The first tie should be within six inches of the terminal block.
 7. Connect the DL3800E unit to a DC power source.
-



WARNING: Damage to the DL3800E unit may result if power is connected improperly. **Do not** operate the DL3800E unit without a ground connection to the ground stud.

The DL3800E unit automatically runs a self-test at power up, during which the front panel displays a self-test message. Payload service resumes upon completion of the self-test and the front panel displays the following default message:

```
EFS 00.0 PERCENT
```



WARNING: Do not operate the DL3800E unit without an earth ground connection to the ground stud.

The DL3800E unit is designed to operate with a negative power supply. This means the positive terminal is connected to the ground.



WARNING: Damage to the DL3800E unit may result if power is connected improperly.

E1 NETWORK CONNECTION

The eight port connector can be either a DB-9, DB-15, or BNC. The connectors are located on the DL3800E unit back panel for connecting to the E1 networks.

Connect the DL3800E unit to each E1 Network using the appropriate cable and connectors, available from Quick Eagle Networks.

DTE CABLE AND CONNECTION

DTE interface connectors are provided on the back of the DL3800E, a 50-pin SCSI socket receptacle for HSSI compatible DTE, and a DB-25 (E1A-530) socket connector for V.35/X.21 or RS-449 compatible DTEs.

If using a HSSI interface, the cable connecting the DL3800E unit to the DTE consists of 25 twisted pairs with an overall foil/braid shield. The DL3800E unit end of the cable should have a plug connector. One 50-pin SCSI socket receptacle is provided on the rear of the DL3800E unit to connect it to HSSI-based networks/systems. Cables and connectors are available from Quick Eagle Networks. Using the appropriate cable and connectors, connect the DL3800E-HSSI connector to the HSSI DTE.

If using a V.35/X.21 interface, use a shielded cable supplied by Quick Eagle Networks to connect the DL3800E unit to the DTE. One DB-25 (E1A-530) socket connector is provided on the back of the DL3800E unit to connect the DL3800E to the V.35/RS-449/X.21 compatible DTE. Using the appropriate cable and connectors, connect the V.35/RS-449/X.21 DTE device to the DL3800E unit.

ASCII TERMINAL AND SNMP CONNECTION

The DL3800E unit is accessed by an ASCII terminal or SNMP Management System workstation through direct, daisy-chained, or dial-up modem connection.

On the rear panel of the DL3800E unit, two socket DE-9 receptacles labeled **NMS** and **COMM PORT** are provided for connection to the SNMP workstation or ASCII terminal, respectively. An RS-232 straight cable, with DE-9 plug connectors, is used to link the DL3800E unit with the terminal, modem, or workstation.

Direct Connection

For direct connection, using the appropriate DE-9 cable, connect the ASCII terminal or SNMP workstation to the DL3800E unit through the Terminal or SNMP connector on the back of the rear panel. The baud rate, parity bit, and stop bit settings must match those of the terminal: baud rate, 9600; eight bits, no parity and two stop bits.

Modem Connection

When using a modem, the baud rate, parity bit, and stop bit settings of the modem must match the terminal or workstation port default settings: baud rate 9600; eight bits; no parity, and two stop bits. If these parameters are not the same, reconfigure the unit default settings using the front panel controls.

When the parameters of the modem and the terminal or workstation port coincide, using the RS-232 straight cable, connect the modem to the appropriate RS-232 comm port (**COMM PORT** or **NMS**) on the rear panel of the DL3800E. Then, connect the modem to the phone line and the ASCII terminal or SNMP workstation. DE-9 to DB-25 adapters and null-modem adapters are available from Quick Eagle Networks. Specify a plug or socket terminal connection when ordering.

For direct connection, the terminal, workstation, or modem may be placed up to 15 meters away from the comm port when operating at 9600 baud. Distances may be increased if the baud rate is reduced.

Telnet Connection

For a telnet connection, connect a device that provides a SLIP connection to the NMS port of the DL3800E unit. Examples include a terminal server, router auxiliary port, or the Quick Eagle Networks Management Access Processor (MAP). Be sure to provide a valid IP address to the DL3800E. There can be up to two active telnet sessions at any given time. There is no way for a user to delete the telnet session of another user.

Daisy Chaining

Multiple DL3800E units can be daisy-chained together through the Terminal Port to provide centralized network monitoring and management capabilities.

A ribbon-type cable with DB-9 connectors is available from Quick Eagle Networks for daisy-chaining your DL3800E units. You can order specific cables to daisy-chain *four* units (Part No. 154-00051-01), *eight* units (Part No. 154-00052-01), or *twelve* units (Part No. 154-00053-01). To place an order, contact the Quick Eagle Networks Sales Department at (408) 745-6200.

If using a cable other than the above, see [“Terminal Connection” on page B-1](#) for Terminal Port pin assignments. With this cable, CTS (pin 8) must be connected between DL3800E units, but must not be connected to the terminal.

The one socket connector on the ribbon is to be connected to the terminal or modem (if a remote site). The remaining plug DE-9 connectors are connected to the DL3800E1 unit port. Each unit must be assigned a unique node number.

When units are daisy-chained together, the local terminal must be operating in Multidrop Mode. Each unit should be given a unique Node Number.



NOTE: For detailed instructions on installing SNMP systems, refer to the separate installation guides for these products.

LOG IN/LOG OFF

Each DL3800E unit is equipped with an integrated RS-232 ASCII user interface that can be accessed through the **COMM PORT** (DE-9 connector) located on the rear panel of the DL3800E. Through this interface, you can perform various functions described in this section.

When operating in multidrop mode (that is, when multiple DL3800E units may be daisy-chained together for centralized network management), you must log in to establish communication with a single unit on the network. Only one unit may be accessed at a time. All units continuously monitor the line, but only the unit which is logged on will respond to terminal commands. When no unit is logged on, the characters typed on the terminal will not show up on the display screen.

To log on and log off a particular unit, follow these procedures:

1. **Type five Ctrl-X commands in a row to return a “roll call” of all Node Numbers on the chain.**

This feature is useful when the Node Numbers of any units on the network are unknown.

2. **Type Ctrl-X followed by #, the node number, and press Enter (or Return).**

These characters will not be displayed on the terminal screen, but the units will receive them.

If passwords are enabled for the unit, you will be prompted for the username and password. Initially, no password or username is needed, so simply press **Enter** when prompted for a username or password.

3. **The Main Menu will appear. If not, check that the Node Number matches what is typed on the terminal.**

If it still does not appear, check that the DL3800E unit port settings match the terminal settings (baud rate, parity, data bits, and stop bits). If so, a null modem adapter may be required to interchange pins 2 and 3 (transmit and receive) from the terminal.

4. To log on to another DL3800E unit on the same daisy chain, simply type **Ctrl-X**, followed by a # and the Node Number and press **Enter**.

The previous unit is logged out and the new unit is logged on.

5. To log off all units without logging onto any new units, press **Ctrl-X** at the Main Menu.

TERMINAL OPERATION OVERVIEW

General Menu Flow

The menu interface for the DL3800E unit consists of the Main Menu, and a series of submenus.

From the Main Menu, select the submenu to be selected or function to be performed by moving the highlight bar through the menu screen with the Cursor Arrow keys until the desired function is highlighted.

To prevent any accidental data and/or status change, every proposed change requires a confirmation response. To confirm a proposed change, move the highlight bar to Confirm on the menu and press **Enter**. Type any other key and the change will not be made. This will cause the terminal to continue to prompt you to confirm the change(s). To abort the change, move the highlight bar to Exit, and press the **Enter** key rather than confirming the change.



NOTE: Pressing the Escape key brings the display back to Select Local/Remote when in the Main Menu, and back to Exit when in the EXECUTION MENU.

Screen Description

The top four lines of each display screen contain information regarding the last two status or alarm conditions reported by the DL3800E unit. This information includes: the severity of condition reported; the date and time condition was reported; the Unit and NET (E1 port) reporting the alarm; a code for the type of condition, and a description of the condition.

The next two lines in the menu, which are always highlighted, represent the Status Bar. The first line of the Status Bar displays the product type, the software release number, node number, node name, date & time, and current alarm status of the unit. The second line displays the selected device address and name.

```
Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
Network 15 Minute UAS Major Threshold Exceeded
Digital Link DL3800E SR 3.00.00 NODE 7: 01/01/90 05:55:07 MN
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

INVERSE MULTIPLEXER MAIN MENU
Select Local/Remote
Alarms & Status
Statistics
Event History
Configuration
System Utilities
Tests
Manual Network Restoration
Logout
```

Figure 4-1 INVERSE MULTIPLEXER MAIN MENU

The product type is a DL3800E Digital Inverse Multiplexer.

The **software revision** is 3.XX, where xx equals the latest software revision. This number is useful to determine the features that are supported with this release.

The **Node number**, in this case 7, is user defined. This can be used to further identify the node within your network. It is recommended that all nodes be given a unique node number. This is crucial in inter-node communications.

The **Node name** (HOME), is user defined. You can use this field to uniquely describe the node within the network.

The **date and time** are give in mm/dd/yy, and hh:mm:ss format.

The **alarm indicator**, in this case MN for minor, is given on each screen to alert you of a local Node alarm.

The **Selected Device address**, in this example 7.00.000 is shown at the beginning of the second status line. A device is a generic term to indicate a NODE (unit).

INVERSE MULTIPLEXER MAIN MENU COMMANDS

When a DL3800E unit is first powered up, the Main Menu ([Figure 4-1 on page 4-3](#)) appears on the terminal screen. This describes those functions that can be performed, parameters viewed, changed and/or deleted from this menu. The INVERSE MULTIPLEXER MAIN MENU items are shown in [Table 4-1](#) (these items are described in more detail in the following sections)..

Table 4-1 Main Menu

Menu	Description
Select Local/Remote	Allows you to move between the Main Menu of the Local and Remote units.
Alarms and Status	Provides current alarm and status report of the common equipment, DTE, and E1 lines.
Statistics	Allows you to access the STATISTICS MENUS of the various E1 lines.
Event History	Allows user to view and clear alarms and event history of the DL3800E.
Configuration	Allows you access submenus to configure certain parameters of the DL3800E, network, and DTE.
System Utilities	Allows you to perform various system utility functions such as download software, configure SNMP, configure login, and delete or save configuration.
Tests	Allows you to initiate diagnostic loopbacks.
Manual Network Restoration	Allows you to manually restore a E1 circuit instead of it being restored automatically upon the clearing of a problem.
Logout	Allows you to log out of the DL3800E unit without having to wait for automatic logout.

SELECT LOCAL/REMOTE

When in the INVERSE MULTIPLEXER MAIN MENU, this option allows you to view and access the other items on either the local or remote DL3800E. The Device Address and Name in the header portion of the display screen will identify the unit that the terminal is presently communicating with.

To move to the Main Menu of the other DL3800E, highlight SELECT LOCAL/REMOTE and press **Enter**. The Device Address and Name in the header should change to the new unit as shown in [Figure 4-1 on page 4-3](#).

ALARMS AND STATUS

The ALARMS AND STATUS MENU is a view-only screen that allows you to review the current ALARMS AND STATUS items being reported by the DL3800E. To access this screen, move the highlight bar in the INVERSE MULTIPLEXER MAIN MENU to ALARMS AND STATUS and press **Enter**.

The ALARMS AND STATUS display (Figure 4-2) will appear on the screen describing the status of the common equipment and each of the E1 ports (lines), plus the status of the DTE leads and the current rate of the DTE port.

```

Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
      Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
      Network 15 Minute UAS Major Threshold Exceeded
Digital Link DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

CURRENT ALARMS AND STATUS ITEMS      Exit Repeat

Common equipment status: No Ext Clk, Primary Clk, No Net Sync
Network ports:
PORT 1: LOS, RED, Active, OOF MN, UAS 15 MIN MJ Relative delay of 0.000 ms
PORT 2: LOS, RED, Active, OOF MN, UAS 15 MIN MJ Relative delay of 0.000 ms
PORT 3: BPV MN, OOF MN, BPVS 15 MIN MN
PORT 4: BPV MN, OOF MN, BPVS 15 MIN MN
PORT 5: LOS, RED, UAS 15 MIN MJ
PORT 6: LOS, RED, UAS 15 MIN MJ
PORT 7: LOS, RED, UAS 15 MIN MJ
PORT 8: LOS, RED, UAS 15 MIN MJ

RS449/X.21 port: DSR ON
Current RS449/X.21 port rate = 3.952 Mbits/sec

```

Figure 4-2 ALARMS AND STATUS MENU

Following are the Alarm and Status items (severity) that may appear. The Common Equipment alarms and status will appear first, followed by the Network and the DTE alarms and status.

Table 4-2 3800E Alarm Descriptions

ALARM	DESCRIPTION
NETWORK	
LOS	Loss of Signal – Net Port does not detect any E1 pulses
LOF	Loss of Frame - Net Port does not detect a valid E1 framing format

Table 4-2 3800E Alarm Descriptions

ALARM	DESCRIPTION
AIS DET	Alarm Indication Signal Detected — Net Port detects an unframed continuous stream of binary ones.
AIS	Alarm Indication Signal — Not used.
YEL Det	Yellow Alarm (RAI — Remote Alarm Indication) Detected. #Net Port detects the presence of an RAI.
YEL	Yellow Alarm (RAI) - Net Port transmits a Yellow Alarm (RAI) when receiving an AIS, LOS, or LOF.
Failed Signal	Not used.
Xmt Failed	Not used.
User Line Lpbk	User Line Loopback — Net Port in a Line Loopback. Enabled by you under the Tests menu.
User Payload Lpbk	User Payload Loopback — Net Port in a Payload Loopback. Enabled by you under the Tests menu.
HW Line Lpbk	Not used.
HW Payload Lpbk	Not used.
Remote Lpbk	A loopback is occurring on the net lines or on the remote unit.
*Active	Net Port is Active. This indicates that the Net Port is part of the bundle passing data to and from the DTE port.
Not Active	Net Port is Inactive. This indicates that the Net Port has been removed from the bundle and is no longer passing data to and from the Data Port.
Excessive Delay	The Net Port has exceeded the 31ms relative delay.
Set Code Detected	The Net Port has detected a Loop code sent from the Network.
Reset Code Detected	Net Port has detected a Loop down code sent from the Network.
CRC Threshold	Net Port has exceeded the CRC Threshold.

Table 4-2 3800E Alarm Descriptions

ALARM	DESCRIPTION
SES Threshold	Net Port has exceeded the Severely Errored Second Threshold.
UAS Threshold	Net Port has exceeded the Unavailable Second Threshold.
BPV MN/MJ	Net Port has declared a Bipolar Violation Major or Minor Alarm.
OOF MN/MJ	Net Port has declared an Out Of Frame Major or Minor Alarm.
BPVs 15 Min. MN/MJ	Net Port has declared a Bipolar Violation 15 minute Major or Minor Alarm
CRCs 15 Min. MN/MJ	Net Port has declared a CRC 15 minute Major or Minor Alarm
ES 15 Min. MN/MJ	Net Port has declared a Errored Second 15 minute Major or Minor Alarm
SES 15 Min. MN/MJ	Net Port has declared a Severely Errored Second 15 minute Major or Minor Alarm.
UAS 15 Min. MN/MJ	Net Port has declared a Unavailable Second 15 minute Major or Minor Alarm.
BPVs 24 Hr MN/MJ	Net Port has declared a Bipolar Violation 24 Hour Major or Minor Alarm.
CRCs 24 Hr MN/MJ	Net Port has declared a CRC 24 Hour Major or Minor Alarm.
ES 24 Hr MN/MJ	Net Port has declared a Errored Second 24 Hour Major or Minor Alarm.
SES 24 Hr MN/MJ	Net Port has declared a Severely Errored Second 24 Hour Major or Minor Alarm.
UAS 24 Hr MN/MJ	Net Port has declared a Unavailable Second 24 Hour Major or Minor Alarm.
COMMON EQUIPMENT	
External Alarm	An External Alarm has been detected. This alarm is based on the External Alarm contacts on the back panel.
Proc Restart	Unit has rebooted.
RAM Test Fail	This occurs if the unit's RAM does not pass the memory test which occurs at startup.

Table 4-2 3800E Alarm Descriptions

ALARM	DESCRIPTION
ROM Checksum Fail	This occurs if the checksum for the code image stored in ROM does not match that expected.
No Ext Clk	No clock detected on the External Clock DB- 9 connector on the back panel.
Primary Clock	The set primary receive clock source is now providing the network receive clock.
Secondary Clk	The set secondary receive clock source is now providing the network receive clock. (Occurs if the primary source has been lost).
Internal Clk	Loss of Internal Clock.
Sync	Net 1 – Net Port 1 is the network receive clock source.
Sync	Net 2 – Net Port 2 is the network receive clock source.
Sync	Net 3 – Net Port 3 is the network receive clock source.
Sync	Net 4 – Net Port 4 is the network receive clock source.
Sync	Net 5 – Net Port 5 is the network receive clock source.
Sync	Net 6 – Net Port 6 is the network receive clock source.
Sync	Net 7 – Net Port 7 is the network receive clock source.
Sync	Net 8 – Net Port 8 is the network receive clock source.
No Net Sync	Shows all port are down. More specifically, if a network clock cannot be sourced from any port.
DTE	
HSSI Channel Lpbk	A HSSI hardware loopback has been set.
User Lpbk	The DTE/Network loopback has been set.
V.35 LT Lpbk	A V.35 hardware loopback has been set.

Table 4-2 3800E Alarm Descriptions

ALARM	DESCRIPTION
DTE Loss	The signal indicating DTE presence has been lost.
DTR On	The V.35 DTR signals is present.
RTS On	The V.35 RTS signal is present.
RLB On	The V.35 DTE Remote Loopback signal has been set.
LT On	The V.35 LT signal is present.
TA On	The HSSI TA signal is present.
LA On	The HSSI LA signal is present.
LB On	The HSSI LB signal is present.
DSR On	The V.35 DSR is asserted.
CTS On	The V.35 CTS signal is asserted.
RLSD On	The V.35 RLSD signal is asserted.
TM On	The V.35 TM signal is asserted.
CA On	The HSSI CA signal is asserted.
LC On	Not used
Line crossed	E1 network lines are crossed.



NOTE: Status display will read ACTIVE, if the DL3800E unit is in Inverse Mux mode and receiving I-Framing on the E1 without Blue, Yellow, or Red Alarms or Major Alarm Thresholds being exceeded.

If the E1 Network Configuration is set to NEVER USE and a good E1 is connected, the Alarm & Status display will read NOT USED.

In Single DSU Mode, the DL3800E unit is Active if it is receiving valid E1 pulses from the network without Blue, Yellow, or Red Alarms or Major Alarm Thresholds being exceeded and 1) if, in HSSI mode, the TA must be asserted or 2) if, in non-HSSI mode, you must select DTR or RTS.

A Blue, Yellow, or Red Alarm or the exceeding of Major Alarm Thresholds will cause the E1 to be taken out of service.

Statistics

This menu allows you to access the performance STATISTICS SUBMENU of any E1 port. Highlight STATISTICS in the INVERSE MUX MAIN MENU, and press the **Enter** key. The STATISTICS MENU appears (Figure 4-3).

```
Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
  Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
  Network 15 Minute UAS Major Threshold Exceeded
Digital Link DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

STATISTICS MENU      Exit

NETWORK 1 STATISTICS
NETWORK 2 STATISTICS
NETWORK 3 STATISTICS
NETWORK 4 STATISTICS
NETWORK 5 STATISTICS
NETWORK 6 STATISTICS
NETWORK 7 STATISTICS
NETWORK 8 STATISTICS
```

Figure 4-3 STATISTICS SUBMENU

To view the performance statistics of any one E1 port, highlight that port and press **Enter**. The NET STATISTICS for that port (Figure 4-4) will appear on the screen.

```

Idled 08/08/97 11:02:33 Unit: 2 NET : 1 <114>
Network 15 Minute UAS Major Threshold Exceeded Idled
Major 08/08/97 11:04:13 Unit: 2 NET : 1 <114>
Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 3.08.26 NODE 2:IMIPOLEX 08/08/97 11:12:29 MJ MN
SELECTED DEVICE ADDRESS: 2.00.000 NAME: IMIPOLEX
NET STATISTICS - PORT 1 Exit Repeat Clear Page 1
CURRENT SECONDS: 0 PAST INTERVALS: 0 ERROR-FREE SECONDS: 100.0%
ESR: 0.0% SESR: 0.0% BBER: 0.0%
CURRENT BPV EB FE ES SES BBE UAS
0 0 0 0 0 0 0 0
CUMULATIVE 1 0 0 0 0 0 0 0
CUMULATIVE 2 0 0 0 0 0 0 0
  
```

Figure 4-4 NET STATISTICS MENU

This screen displays the selected port's E1 performance statistics for the current 15-minute interval and for the past 48-hour interval. The performance statistics for the first 24 hours are in both accumulative form and in 15-minute intervals. The statistics for the second 24 hours are only in accumulative form. It also allows you to clear the display and reset the counters. For the DL3800E unit, the E1 statistics displayed are BPV, EB, FE, ES, SES, BBE, UAS, EFS, ESR, SESR, and BBER.

To view additional pages with this set of performance data, press the Cursor DOWN ARROW, or to view the previous page, press the Cursor UP ARROW.

Additional NET STATISTICS are presented in subsequent screens. To view additional screens with this same set of performance data, press the tab key or the Cursor right and left arrow keys until the next field is highlighted, then press **Enter**. Continue to press **Enter** with the NEXT field highlighted to view all the screens.

This screen contains NET STATISTICS snapshots at 15-minute intervals.

```

DIGITAL LINK DL3800E SR 3.00.22 NODE 1:          09/20/00 03:55:17 MJ
SELECTED DEVICE ADDRESS: 1.00.000 NAME:

NET STATISTICS - PORT 1  Exit Repeat Clear          Page 1

CURRENT SECONDS: 563      PAST INTERVALS: 192      ERROR-FREE SECONDS: 100.0%
      ESR: 0.0%              SESR: 0.0%              BBER: 0.0%

      BPV      EB      FE      ES      SES      BBE      UAS
CURRENT          0      0      0      0      0      0      0
CUMULATIVE 1    0      0      0      0      0      0      0
CUMULATIVE 2    0      0      0      0      0      0      0
03:30-03:45     0      0      0      0      0      0      0
03:15-03:30     0      0      0      0      0      0      0
03:00-03:15     0      0      0      0      0      0      0
02:45-03:00     0      0      0      0      0      0      0
02:30-02:45     0      0      0      0      0      0      0

```

Figure 4-5 Additional NET STATISTICS

Table 4-3 NET Statistics Items

Parameter	Definition
EFS	Error Free Seconds (EFS) is calculated whenever ESR is calculated, and is the simple percentage complement of ESR: $EFS = 100.0 - ESR$. When there have been UAS in the statistics history for the past 24 hours, then EFS is set at 100%.
ESR	Errored Second Ratio (ESR) is the ratio of ES to total seconds in available time during a fixed measurement interval. The fixed interval is the last 24 hours before the current 15-minute interval. When there have been UAS in the statistics history for the past 24 hours, then ESR is set at 0%.
SESR	Severely Errored Second Ration (SESR) is the ratio of SES to total seconds in available time during a fixed-measurement interval. The fixed interval to be used is the last 24 hours before the current 15-minute interval. When there have been UAS in the statistics history for the past 24 hours, then SESR is set at 0%.
BBER	Background Block Error Ratio (BBER) is the ratio of errored blocks to total blocks during a fixed-measurement interval, excluding all blocks during SES and unavailable time. The fixed interval is equal to the last 24 hours before the current 15-minute interval.

Table 4-3 NET Statistics Items (Continued)

Parameter	Definition
BPV	This display provides the number of Bipolar Violations (BPVs) that have occurred during the accumulation period. A total of 15430 BPVs in a 10-second sliding window (approximately 10-3) will create a Major Alarm and 916 BPVs in a 600-second sliding window (approximately 10-6) will create a Minor Alarm.
FE	A Frame Error (FE) is declared when two out of four consecutive framing bits are in error. Typically, an FE indication will be accompanied by a significant number of payload data bit errors. This display provides the number of FEs that have occurred in the accumulation period.
EB/CV	<p>An Errored Block (EB) is a block in which one or more bits are in error. The EB is therefore equivalent to the Code Violation (CV) count calculated and displayed in the previous versions of the DL3800E unit. This count allows you to monitor the rate of EB faults on a line that is unavailable.</p> <p>EBs are counted in the unavailable state; ES, SES, and BBE are not counted in the unavailable state.</p>
ES	An Errored Second (ES) is a one-second period with one or more errored blocks (such as one or more CRC4 errors) or an Out Of Frame (OOF). This display provides the number of ESs that have occurred in the accumulation period. ESs are not accumulated during UAS.
SES	<p>Severely Errored Seconds (SES) is a one-second period which contains 30% or more errored blocks or at least one severely disturbed period (SDP). An SDP is present if either a LOS, AIAS, or LOF occurs.</p> <p>Since there are 1000 blocks per second, an SES is a one-second period which contains either a combination of 300 or more CRC4 errors, an OOF, or at least one of the following: LOS, AIS, or LOF. This requirement is a slight change from the prior DL3800E unit SES definition, which required 320 or more CRC4 errors or LOS, AIS, or LOF. SESs are not accumulated during UAS.</p>
BBE	A Background Block Error (BBE) is an errored block not occurring as part of an SES. A BBE is calculated and displayed as a raw count of non-SES EBs. The count is updated at the end of every measurement second excepting any second that is an SES. The updated count is discarded for all UAS.

Table 4-3 NET Statistics Items (Continued)

Parameter	Definition
UAS	<p>Unavailable Seconds. This display provides the number of UAS that have occurred in the accumulation period. At the onset of 10 consecutive SES events, a period of unavailable seconds begins. These 10 seconds are part of the unavailable seconds count. At the onset of 10 consecutive non-SES events, a new period of available time begins. These 10 seconds are part of available time.</p> <p>UAS occurs as soon as a Red Alarm is invoked (such as after two seconds of LOS.)</p> <p>ES, SES, and BBE are not counted during unavailable time. Rate parameters ESR, SESR, and BBER are the ratio of the fault-seconds count to the total seconds in available time.</p>

Event History

Use this screen to review and clear the DL3800E unit alarm and status history.

To view the EVENT HISTORY, move the highlight bar to EVENT HISTORY in the NODE MAIN MENU, and press **Enter**. Use the up and down keys to move to the next or previous page of the EVENT HISTORY MENU.

Table 4-4 Alarm Level

Alarm Parameter	Definition
Alarm Level:	
Major	Service affecting
Minor	Needs attention, not yet service affecting
Idled	Alarm condition has expired
Status	Non-service-affecting event
Date and Time	Date and time of the occurrence or expiration of the alarm/state
Address	The address is the physical location
Device	The device reporting the status and alarm condition (Unit #), and the type of device (NET, DTE, or NODE)
Event Code	Number designation for type of alarm or status condition. This number will be useful when contacting the factory
Description	Describes the event

To clear the report of all History Events, move the highlight bar to CLEAR HISTORY and press **Enter**. [Figure 4-6](#) is an example.

```

Major 01/01/90 17:56:47 Unit: 1NET : 2(33)
      Loss of Frame
Idled 01/01/90 17:56:58 Unit: 1NET : 2(13)
      Loss of Frame Idled

DIGITAL LINK DL3800E SR 2.00.000 NODE 7:HOME 01/01/90
03:14:54 MN SELECTED DEVICE ADDRESS: 7.00.000NAME:HOME

EVENT HISTORY      Exit      Repeat  Clear History      Page 1

Idled      01/01/9009:02:10Unit 1NET 2 (29)
      Yellow Signal Detected Idled
Major      01/01/9009:02:06Unit 1NET 2 (30)
      Yellow Alarm
Status     01/01/9008:58:09Unit 1NET 2 (29)
      Yellow Signal Detected
Idled      01/01/9008:58:01Unit 2NET 3 (29)
      Yellow Signal Detected Idled
Minor      01/01/9008:56:24Unit 1Node (36)
      ROM Checksum Failed
    
```

Figure 4-6 EVENT HISTORY MENU

Configuration

The CONFIGURATION MENU item provides access to a series of submenus to configure various parameters of the unit, DTE, and network.

Highlight Configuration in the INVERSE MULTIPLEXER MAIN MENU and press **Enter** to access the CONFIGURATION MENU. See [Figure 4-7](#).

```
Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
      Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
      Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

CONFIGURATION MENU      Exit

Unit
DTE
Network
Network Thresholds
SAVE configuration
```

Figure 4-7 CONFIGURATION MENU

To access any of the configuration submenus, highlight the desired item and press the **Enter** key. The following are samples and descriptions of the submenus that can be accessed from the CONFIGURATION MENU.

Unit Configuration

Highlighting **UNIT** and pressing the **Enter** key accesses the UNIT CONFIGURATION MENU shown in [Figure 4-8](#). The configurable items and options are described in [Table 4-5](#).

The following parameters can be set or changed for the Node: DATE, TIME, ALARM ENABLE, AUTOMATIC BACKUP, FRONT PANEL, PERMIT SELECT DEVICE ACCESS FROM REMOTE, UNIT NUMBER, UNIT NAME and LOCAL TERMINAL BAUD RATE, BITS/PARITY, STOP BITS, X-ON/X-OFF and MULTIDROP MODE. HARDWARE, SOFTWARE and MIB REVISIONS are view-only items and cannot be changed.

```

DIGITAL LINK DL3800E SR 3.00.22 NODE 1: 08/27/00 00:54:47 MAJOR
SELECTED DEVICE ADDRESS: 1.00.000 NAME:

UNIT CONFIGURATION Exit Confirm
DATE: 08/27/00
TIME: 00:54:38
ALARM ENABLE: Disabled
AUTOMATIC BACKUP: 5 minutes after a database change.
FRONT PANEL: On
PERMIT SELECT DEVICE ACCESS FROM REMOTE: No
UNIT NUMBER: 1
UNIT NAME:
SOFT SERIAL #: 1389031127991
HARDWARE REVISION: H SOFTWARE REVISION: 3.00.22 (DOWNLOADED)
MIB REVISION: 1.10 January 10 2000
TERMINAL BAUD RATE: 9600
TERMINAL #BITS AND PARITY: 8 bits, No parity
TERMINAL STOP BITS: 2 bits
    
```

Figure 4-8 UNIT CONFIGURATION MENU

Table 4-5 Node Configuration Options

Option	Action
Date	Move the highlight bar to Date, and enter a valid date with the format MM/DD/YY, and press the Enter key. MM 1-12 month DD 1-31 date YY: 0-99 year
Time	Move the highlight bar to Time, and enter a valid time with the format hh:mm:ss, and press the Enter key. HH 0-23 hours MM 0-59 minutes SS 0-59 seconds
Alarm Enable	This option allows you to ENABLE or DISABLE the DL3800E unit External Alarms. Highlight ALARM ENABLE and, using the space bar, toggle between ENABLED and DISABLED until the desired choice appears.
Automatic Backup	This feature allows you to backup the database to the EEPROM automatically, at certain intervals, or manually. To change the present backup mode, highlight Automatic Backup, and use the Space Bar to toggle between the following choices: after every database change, 15 seconds, 30 seconds, 1 minute, five minutes after each change, or Off (must change manually with Save Configuration).

Table 4-5 Node Configuration Options

Option	Action
Front Panel	This feature enables (On) or disables (Off) your ability to make changes in the configuration or run tests from the front panel display and buttons. To change the Front Panel feature, highlight Front Panel, and use the Space Bar to toggle between Off and On.
Permit Select Device Access From Remote	This feature enables (Yes) or disables (No) the capability that allows you to view and access the local configuration settings from the remote unit.
Unit Number	Move the Highlight bar to Unit Number, and enter a number between 1 and 9999. Note: Each unit must be set to a different number to allow remote communication, and daisy chaining of multiple units. For example, if the remote unit is set to the same number as the local unit, you will not be able to access the remote unit.
Unit Name	Move the highlight bar to UNIT NAME and enter alphanumeric name of up to 20 digits. Press Enter when finished.
Soft Serial Number	<p>This feature allows you to view the local serial number.</p> <p>If the remote unit is not software compatible with the soft serial number feature, the Unit Configuration screen still displays the serial number field but the information is incorrect. All the other information on the screen (for example, node number, hardware revision number) is still accurate.</p> <p>The soft serial number is preserved if you enter a "Reset Entire Node Database to Factory Defaults" command.</p>
Terminal Baud Rate	This feature selects the terminal baud rate. To set or change the baud rate, move the highlight bar to Terminal Baud Rate, and press the Space Bar to toggle between the options: 300, 600, 1200, 2400, 4800, 9600, 19,200, and 38,400. (Default - 9600)
Terminal Parity & Bits	This feature selects the terminal parity and Bits. To set or change the local terminal parity and Bits, move the highlight bar to Terminal Parity & Bits, and press the Space Bar to toggle between the options 7,8, None, Odd, and Even. (Default - 8 None)
Terminal Stop Bits	This feature selects the terminal stop bit requirement. To set or change the requirement, move the highlight bar to Terminal Stop Bits, and press the Space Bar to toggle between the options 1, 1.5, or 2. (Default - 2)
Terminal XOn/XOff	This allows you to enable or disable the XOn/XOff Flow Control feature. With the Flow Control feature On, the terminal can request that the unit quit sending data when its buffers are full. To set or change this feature, move the highlight bar to Terminal XOn/XOff, and use the Space Bar to select choice. (Default - On)

Table 4-5 Node Configuration Options

Option	Action
Terminal Multidrop Mode	If the terminal is connected to more than one DL3800E, it must be in Multidrop Mode. If it is connected to only one unit, this feature can be disabled. When it is disabled, the system starts up directly, without you having to log in. To change this configuration, move the highlight bar to Terminal Multidrop Mode, and use the Space Bar to toggle between the options Enabled, and Disabled. (Default - Enabled)

To update the node database with all the changes made, move the highlight bar to CONFIRM and press **Enter**. Changes can be confirmed after each change, or, after all changes have been made. This completes the node configuration. To abort the changes, move the highlight bar to EXIT and press **Enter** before confirming the changes. (Note: If the terminal speed, parity or stop bits are changed, it is necessary to change the terminal before continuing.)

DTE Configuration

This menu allows you to configure certain parameters of the DTE, including the interface type, clock source, status of leads, and loss criteria.

To access the DTE CONFIGURATION MENU, move the highlight bar to DTE CONFIGURATION in the CONFIGURATION MENU, and press **Enter**.

Figure 4-9, 4-10, 4-11, and 4-12 are examples of the DTE Configuration Interface Menus (V.35, RS-449, X.21, and HSSI), and Table 4-6 describes the menu items.

```
DIGITAL LINK DL3800E SR 3.00.22 NODE 1: 09/20/00 03:55:47 MJ
SELECTED DEVICE ADDRESS: 1.00.000 NAME:

DTE CONFIGURATION Exit Confirm

DTE INTERFACE: V.35
DTE TOGGLE INTERVAL: 2 sec
V.35/RS-449/X.21 OPTIONS:
CLOCK: SCTE Tx Clock: INVERTED Rx Clock: NORMAL
RLSD MODE: AUTOMATIC
DSR MODE: AUTOMATIC
CTS MODE: AUTOMATIC
TM MODE: AUTOMATIC
DTE LOSS DETECTION: NONE
HSSI OPTIONS:
CA MODE:
DTE LOSS DETECTION:
```

Figure 4-9 DTE CONFIGURATION MENU (V.35)

```
DIGITAL LINK DL3800E SR 3.00.22 NODE 1: 08/27/00 00:52:37 MJ
SELECTED DEVICE ADDRESS: 1.00.000 NAME:

DTE CONFIGURATION Exit Confirm

DTE INTERFACE: RS-449
DTE TOGGLE INTERVAL: None
V.35/RS-449/X.21 OPTIONS:
CLOCK: SCTE Tx Clock: NORMAL Rx Clock: NORMAL
RLSD MODE: AUTOMATIC
DSR MODE: AUTOMATIC
CTS MODE: AUTOMATIC
TM MODE: AUTOMATIC
DTE LOSS DETECTION: RTS
HSSI OPTIONS:
CA MODE:
DTE LOSS DETECTION:
```

Figure 4-10 DTE CONFIGURATION MENU (RS449)

```

DIGITAL LINK DL3800E SR 3.00.22 NODE 1: 09/20/00 03:56:16 MJ
SELECTED DEVICE ADDRESS: 1.00.000 NAME:
You must confirm to save changes.
DTE CONFIGURATION Exit Confirm

DTE INTERFACE: X.21
DTE TOGGLE INTERVAL: 2 sec
V.35/RS-449/X.21 OPTIONS:
CLOCK: SCTE Tx Clock: INVERTED Rx Clock: NORMAL
RLSD MODE: AUTOMATIC
DSR MODE:
CTS MODE:
TM MODE:
DTE LOSS DETECTION: NONE
HSSI OPTIONS:
CA MODE:
DTE LOSS DETECTION:

```

Figure 4-11 DTE CONFIGURATION MENU (X.21)

```

DIGITAL LINK DL3800E SR 3.00.22 NODE 1: 08/27/00 00:53:38 MAJOR
SELECTED DEVICE ADDRESS: 1.00.000 NAME:

DTE CONFIGURATION Exit Confirm

DTE INTERFACE: HSSI
DTE TOGGLE INTERVAL: 2 sec
V.35/RS-449/X.21 OPTIONS:
CLOCK: Tx Clock: Rx Clock:
RLSD MODE:
DSR MODE:
CTS MODE:
TM MODE:
DTE LOSS DETECTION:
HSSI OPTIONS:
CA MODE: AUTOMATIC
DTE LOSS DETECTION: TA

```

Figure 4-12 DTE CONFIGURATION MENU (HSSI)

Table 4-6 DTE CONFIGURATION MENU Options

Parameter	Description/Action
DTE Interface	<p>This allows you to select V.35, RS449, X.21 or HSSI as the DTE Interface.</p> <p>To change the present DTE Interface, use the UP and DOWN ARROW keys to highlight DTE Interface. Use the Space Bar to toggle between V.35, RS-449, X.21, and HSSI until the desired choice appears. Highlight Confirm, and press the Enter key to confirm the change. (Default - V.35)</p>
DTE Toggle Interval	<p>This parameter determines the length of the interval during which the DTE lead indicating signal presence is deasserted when a change in the DTE data rate occurs.</p> <p>The DTE data rate changes if a network port goes or is taken out of service, or if a network loopback is set. The DTE lead toggled is RLSD in V.35, RS449, and X.21 modes, and CA in HSSI mode. This toggle interval is needed by some DTE devices to allow resynchronization to the new data rate. The interval may be set to NONE, 0.5, 1.0, 1.5, or 2.0 seconds. (Default - NONE)</p>
Clock	<p>This item allows you to enable either the SCT or SCTE leads, and to set the transmit (Tx), and receive (Rx) to Normal or Inverted mode.</p> <p>Note: In x.21 mode SCT corresponds to the S clock signal and SCTE to the x clock signal.</p> <p>To set the DTE Clock parameters, use the UP and DOWN ARROW keys to highlight the configurable Clock items, and use the Space Bar to toggle between the selections until the desired choice appears. The options are SCT or SCTE, Tx Normal or Inverted, and Rx Normal or Inverted. When the desired selection is in the display, highlight Confirm, and press the Enter key to confirm the change (Default - SCTE, Tx Normal, Rx Normal)</p>
RLSD (Receive Line Signal Detector)	<p>This allows you to Assert, DeAssert, or set to Automatic the RLSD leads.</p> <p>To change or set the RLSD lead status, use the UP and DOWN ARROW keys to highlight RLSD, and use the Space Bar to toggle between Assert, DeAssert, or Automatic until the desired choice appears. Highlight Confirm, and press the Enter key to confirm the change. (In Automatic mode, the 3800E places the signal high when you have a clear signal from the network, indicating the E1 is up and running.)</p> <p>In X.21 mode, RLSD refers to the X.21 signal called Indication. (Default - Automatic)</p>

Table 4-6 DTE CONFIGURATION MENU Options (Continued)

Parameter	Description/Action
DSR (Data Set Ready)	<p>This allows you to Assert, DeAssert, or set to automatic the DSR leads.</p> <p>To change or set the DSR lead status, use the UP and DOWN ARROW keys to highlight RLSD, and use the Space Bar to toggle between Assert, DeAssert, or Automatic until the desired choice appears. Highlight Confirm, and press the Enter key to confirm the change. (In Automatic mode, the 3800E places the signal high when the DTE is sending the associated signal lead DTR.) (Default - Automatic)</p>
CTS (Clear To Send)	<p>This allows you to Assert, DeAssert, or set to Automatic the CTS leads.</p> <p>To change or set the CTS lead status, use the UP and DOWN ARROW keys to highlight CTS, and use the Space Bar to toggle between Assert, DeAssert, or Automatic until the desired choice appears. Highlight Confirm, and press the Enter key to confirm the change. (In Automatic mode, the 3800E places the signal high when the DTE is sending the associated signal lead RTS.) (Default-Automatic)</p>
TM (Test Mode)	<p>This allows you to Assert, DeAssert, or set to Automatic the TM leads.</p> <p>To change or set the TM lead status, use the UP and DOWN ARROW keys to highlight TM, and use the Space Bar to toggle between Assert, DeAssert, or Automatic until the desired choice appears. Highlight Confirm, and press Enter to confirm the change. (In Automatic mode, the 3800E places the signal high when the DCE's signal leads for enabling tests are placed high by the DTE.) (Default - Automatic)</p>
DTE Loss Detection	<p>Sets the criteria by which a DTE Loss Of Signal will be detected.</p> <p>In X.21 mode RTS refers to the X.21 signal called Control.</p> <p>To change or set the DTE LOS criteria, use the UP and DOWN ARROW keys to highlight DTE LOSS DETECTION, and use the Space Bar to toggle between the choices: RTS, DTR, and None. When the desired choice is shown, highlight Confirm, and press Enter to confirm the change. (In x.21 mode, RTS refers to the x.21 signal called Control). (Default - RTS) The following entries must be added:</p>

Table 4-6 DTE CONFIGURATION MENU Options (Continued)

Parameter	Description/Action
CA MODE	<p>Allows user to set the CA lead to ASSERT, DEASSERT, or AUTOMATIC when the interface is set to HSSI.</p> <p>This setting is only accessible when the interface type is set to HSSI. To change or set the CA lead status, use the UP and DOWN ARROW keys to highlight CA and use space bar to toggle between ASSERT, DESSERT, or AUTOMATIC until the desired choice appears. Highlight CONFIRM and press Enter to confirm the change. (In AUTOMATIC mode, the 3800 places the signal high when there is one or more active network signals.) (Default - AUTOMATIC)</p>
DTE LOSS DETECTION	<p>Allows users to set the criteria by which a DTE Loss of Signal will be detected when the interface is set to HSSI.</p> <p>This setting is only accessible when the interface type is set to HSSI. To change or set the DTE LOS criteria, use the UP and DOWN ARROW keys to highlight DTE LOSS DETECTION and use the space bar to toggle between TA and NONE until the desired choice appears. Highlight CONFIRM and press Enter to confirm the change. (Default - TA)</p>

Network Configuration

This submenu allows you to configure various Network parameters. The configurable parameters include CRC4, T SLOT16, and National Bits.

To access the NETWORK CONFIGURATION MENU, move the highlight bar to NETWORK CONFIGURATION in the CONFIGURATION MENU and press **Return**.

The NETWORK CONFIGURATION MENU will be slightly different depending on which version DL3800E unit is being used. [Figure 4-13](#) shows the NETWORK CONFIGURATION MENU. [Table 4-7](#) describes the various parameters included.

```

Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

NETWORK CONFIGURATION Exit Confirm

PORT ALARM ACTIVE/RESTORE CRC4 TSLOT16 N1 N2 N3 N4 N5
1 REPORT Use w/auto restoreENABLE DATA 1 1 1 1 1
2 REPORT Use w/auto restoreENABLE DATA 1 1 1 1 1
3 MASK Never Use ENABLE DATA 1 1 1 1 1
4 MASK Never Use ENABLE DATA 1 1 1 1 1
5 MASK Never Use ENABLE DATA 1 1 1 1 1
6 MASK Never UseENABLE DATA 1 1 1 1 1
7 REPORT Use w/auto restoreENABLE DATA 1 1 1 1 1
8 MASK Never Use ENABLE DATA 1 1 1 1 1

Primary Clock Source: Xmt: Int Rcv: Net 1
Secondary Clock Source: Xmt: Net Rcv: Net 2
DSU MODE: Inverse Mux (Standard operation) Suppress Yellow Det.: Disabled
Second Error restoral interval: Immediate
Hardware Revision: Port 3&4: -- Port 5&6: -- Port 7&8: --

```

Figure 4-13 Network Configuration Screen

Table 4-7 NETWORK CONFIGURATION MENU Options

Parameter	Description/Action
Alarm	<p>This item allows you to enable (Report) or disable (Mask) the DL3800E unit from reporting alarms or sending SNMP traps from any of the individual E1 network ports.</p> <p>To change the present Alarm mode, use the UP and DOWN ARROW keys to highlight the Alarm item in the appropriate line for the desired port, and use the Space Bar to toggle between Report and Mask. Highlight Confirm, and press the Enter key to confirm any change. (Default - Mask)</p>
Active/Restore Mode	<p>Selects the Active/Restore Mode for each of the E1 network ports.</p> <p>To change the present mode, use the UP and DOWN ARROW keys to highlight the Active/Restore Mode option for the desired port, and use the Space Bar to toggle between the following selections until the desired choice appears: use w/auto restore (failed line is restored automatically when problem is solved); use w/manual restore (user must manually restore line); Never Use (never mux data onto this line); Install/Test only (always mux data onto this line, even when it's bad). (Default - Never Use)</p>
CRC4	Allows CRC4 coding to be enabled or disabled

Table 4-7 NETWORK CONFIGURATION MENU Options (Continued)

Parameter	Description/Action
TSLOT16	<p>Allows you to select between DATA and FLAG. If DATA is selected, timeslot 16 will be used for payload data. If FLAG is selected, timeslot 16 will not be used for payload and will be stuffed with the value 7E hex.</p> <p>NOTE: E1 links are not truly independent. This field is selectable on a per-E1 link basis. When the DL3800E unit treats the set of E1 links as a whole. If only one E1 link is selected for FLAG, then the DTE bandwidth is reduced to an amount corresponding to all links having been set for a time slot loss.</p>
Primary Clock Source	<p>This allows you to select either the Primary Clock Source, transmit (xmt), and receive (rcv) for the individual E1 network ports.</p> <p>To change the present Primary Clock Source, use the UP and DOWN ARROW keys to highlight either Xmt or Rcv on the Primary Clock Source line, and use the Space Bar to toggle between the choices. For Xmt (transmit) the choices are Network (NET), External (EXT), and Internal (INT). For Rcv (receive) the choices are Net-1 through Net 8 (each of the individual E1 network ports), or Auto (the unit selects the best source).</p> <p>The DL3800E unit can use several sources to generate the transmit clock. The Internal selection uses an oscillator within the DL3800E, the Network setting recovers the clock from the selected E1 line, and the External setting recovers the clock from the dB-9 Ext. Clock connector on the rear panel of the unit. Typically, the clock source on one side of the link is set to Internal, and the other is set to Network. (Default - Smt: Int., Rcv: Net 1)</p>
Secondary Clock Source	<p>This allows you to select either the Secondary Clock Source, transmit (xmt), and receive (rcv) for the individual E1 network ports.</p> <p>To change the present Secondary Clock Source, use the UP and DOWN ARROW keys to highlight either Xmt or Rcv on the Secondary Clock Source line, and use the Space Bar to toggle between the choices. For Xmt (transmit), the choices are Network (NET), External (EXT), and Internal (INT). For Rcv, the choices are Net-1 through Net 8 (each of the individual E1 network ports) or Auto (the unit selects the best source) until the desired choice appears. (Default - Xmt: Int, Rcv: Net2)</p>
DSU Mode	<p>This allows you to set the DL3800E unit up as a DSU, with one DTE, and one Network port.</p> <p>To change the present DSU Mode level, use the UP and DOWN ARROW keys to highlight the DSU Mode item, and use the Space Bar to toggle between the following selections until the desired choice appears: Inverse MUX (standard operation) or Single E1 DSU. Highlight Confirm, and press the Enter key to confirm the change. (Default-Inverse Mux)</p>

Table 4-7 NETWORK CONFIGURATION MENU Options (Continued)

Parameter	Description/Action
Suppress Yellow Detect	<p>This item allows you to configure the unit to ignore or report RAI alarm conditions.</p> <p>To change the present Suppress Yellow Detect, use the UP and DOWN ARROW keys to highlight the item, and use the Space Bar to toggle between Enabled and Disabled until the desired choice appears. Highlight Confirm, and press the Enter key to confirm the change. (Default - Disabled)</p>
Second Error Restoral Interval	<p>The second error restoral configuration is found on the Network Configuration Screen on the DL3800E/3900s. Choices for configuration are immediate, 5, 10, 15, 30 seconds and 1, 5, 10, 15 minutes. As seen from previous discussions on fallback conditions, you should notice that it is possible that an E1 will constantly go in and out of service on a flaky circuit. Every time an E1 is taken out of service or put in-service this will momentarily affect your traffic on the other E1s. In order to prevent this problem second error restoral was created.</p> <p>Second error restoral is a feature that will allow the Imux units to monitor a bad E1 for a period of time after it has gone out of service and come back on-line. Once an E1 has come back after the first out of service state has occurred the Imux unit will monitor the E1 for the second error restoral interval selected. If a second out of service state occurs during the monitoring period the Imux unit will keep the E1 out of service (when the E1 is good again) for the SER time. Every time a new error occurs with in the second error restoral period, when it is keeping the E1 out of service, will restart the SER counter. Once the SER timer expires the E1 will be restored and the process will start again. You can look SER like two strikes and your out for E1s on Imux units.</p>

Network Thresholds

This menu allows you to enable/disable the automatic FALLBACK feature and set the various Network Alarm Thresholds that will cause the E1 lines to automatically be taken out of service.

[Figure 4-14](#) is an example of the NETWORK ALARM THRESHOLDS configuration screen.

```

Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
      Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
      Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

NETWORK ALARM THRESHOLDS      Exit Confirm

CONSECUTIVE THRESHOLDS      FALLBACK      SECONDS
      CRC Seconds Disabled 10
      SES      Disabled 10
      UAS      Disabled 10

INTERVAL THRESHOLDS          15 MINUTES          24 HOURS
      FALLBACK          MAJOR MINOR FALLBACK MAJOR MINOR
BPV Err Sec(10E-3)          Disabled          100 100 Disabled 10 10
CRC Seconds                  Disabled          100 100 Disabled 10 10
ES                            Disabled          100 100 Disabled 10 10
SES                            Disabled          100 100 Disabled 10 10
UAS                            Disabled          100 100 Disabled 10 10

```

Figure 4-14 Network Thresholds Configuration

Through the CONSECUTIVE THRESHOLDS section of this menu, you disable or enable the fallback condition relating to the number of consecutive seconds (from 1 to 100) in which a CRC, SES or UAS alarm threshold is exceeded. To Enable or Disable the FALLBACK feature, highlight the appropriate item, and use the space bar to select your choice. To change the number of errored consecutive seconds that will cause that E1 line to go out of service, highlight the appropriate item and press **Enter**. When the highlight bar is blank, type in the number of seconds desired.



NOTE: Default settings are shown in [Figure 4-14](#)

The INTERVAL THRESHOLDS section of this menu allows you to enable or disable the FALLBACK feature. FALLBACK relates to the number of in-error seconds (from 1 to 900) occurring in a 15-minute period, or the number of in-error 15-minute intervals (from 1 to 96) occurring in a 24-hour period that will cause a MAJOR or MINOR alarm. To Enable or Disable the FALLBACK feature, highlight the appropriate item and use the space bar to select your choice. To change the number of in error seconds or 15-minute intervals that will cause a MAJOR or MINOR network alarm, highlight the appropriate item and press **Enter**. When the highlight bar is blank, type in the number desired.

Save Configuration

This option allows you to manually back up the database to EEPROM at any time. To Save Configuration and back up the database to EEPROM, highlight the Save Configuration in the CONFIGURATION MENU, and press the **Enter** key.

System Utilities

The SYSTEM UTILITIES MENU in the INVERSE MULTIPLEXER MAIN MENU is used to access submenus in the DL3800E unit to configure various system utilities and perform certain functions with the DL3800E. These System Utilities include Software Download, Delete Entire Node Configuration, Login Configuration, SNMP Configuration, and Save Configuration.

To access the SYSTEM UTILITIES MENU, highlight System Utilities in the INVERSE MULTIPLEXER MAIN MENU, and press the **Enter** key.

[Figure 4-15](#) is an example of the SYSTEM UTILITIES MENU that will appear. To access any of the submenus or perform certain functions, highlight that line item, and press the **Enter** key.

```

Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

SYSTEM UTILITIES MENU      Exit

SYSTEM UTILITIES MENUExit
Software Download
DELETE Entire Unit Configuration
Login Configuration
SNMP Configuration
SAVE Configuration
  
```

Figure 4-15 SYSTEM UTILITIES MENU

Software Download

This selection is used to choose the desired mode for upgrading the DL3800E unit software revision level via download if this option is available. Highlight SOFTWARE DOWNLOAD in the SYSTEM UTILITIES MENU and press **Enter**. The SOFTWARE DOWNLOAD MENU (Figure 4-16) appears on the screen.

```
DIGITAL LINK DL3800E SR 3.00.22 NODE 1: 08/27/00 00:55:24 MAJOR
SELECTED DEVICE ADDRESS: 1.00.000 NAME:

DOWNLOAD NEW SOFTWARE Exit Confirm

DOWNLOAD PROTOCOL: None
DOWNLOAD DESTINATION: Remote Unit

-- DOWNLOAD OPTIONS, LOCAL END --
IMMEDIATE SOFTWARE ACTIVATION: Enabled
RAM SOFTWARE OPTIONS: None
```

Figure 4-16 SOFTWARE DOWNLOAD MENU



NOTE: DL3800E units with different software versions may not support all features available in the more recent version. It is recommended that local and remote units have identical software versions installed. If possible, both local and remote units should always be upgraded when installing newer software versions.

The following equipment is required to download new software.

- A PC with a disk drive capable of reading an MS DOS binary file is required. Quick Eagle Networks provides a 3.5 inch floppy formatted for 1.4 Mb for downloading software.
- A terminal emulation program such as Procomm, Mirror, or Xtalk with VT100 or ANSI emulation that supports one or all of the following:
 - Motorola S-Records with ASCII Transfer
 - Binary Image with Xmodem
 - Binary Image with Kermit

Make the proper RS-232 connection between the PC and the DL3800E. A DE-9 connector is pinned out on the DL3800E unit such that the use of a null modem is not necessary. DE-9 to DB-25 adapters may be needed depending upon the PC used.



NOTE: The following steps are recommended before initiating the download process.

- Disable all control lead dependencies (RTS, CTS, DCD, etc.)
- Disable XON/XOFF flow control.
- Disable DCD (Data Carrier Detect) aborts (especially on Procomm).

-
1. Copy the files off the floppy onto the hard drive on the PC. The names of the files will vary in accordance with the current software revision. The file name should look similar to the following: V10xxxxx.RAM.
 2. Start the emulation program on the PC and set it up match the DL3800E unit comm port configuration. Default configuration for the DL3800E unit is 9600 Baud, 8 bits, No parity, 2 stop bits. Connect the PC serial port to the DL3800E unit **COMM PORT**.
 3. If the DL3800E unit is set up for “Direct Terminal” configuration, typing a **Ctrl-L** will refresh the screen. If it is set up for multidrop mode, see [“Log In/Log Off” on page 4-1](#) on how to Log in to a unit.
 4. Select the `Software Download` option from the **SYSTEM UTILITIES MENU**. On the **SYSTEM UTILITIES MENU**, scroll down to where it says `None` and press the space bar until the desired mode appears. Select `CONFIRM` and press **Enter** again to save the change. The DL3800E unit is now ready to receive a file.
 5. Enter the file transfer mode on the terminal emulation program and transfer the appropriate file. The file transfer will take at least 10 minutes at 9600 baud.
 6. Once the file has downloaded, the DL3800E unit will take up to 30 seconds to reboot if the **IMMEDIATE SOFTWARE ACTIVATION** feature is enabled. If any communications errors were encountered, it may be necessary to perform this operation again.

Software Download Options

Immediate Software Activation (Enable/Disable)

The IMMEDIATE SOFTWARE ACTIVATION mode is controlled from the SYSTEMS UTILITIES/SOFTWARE DOWNLOAD MENU. When the IMMEDIATE SOFTWARE ACTIVATION feature is enabled, the software download (using MSR, Xmodem, Kermit, TFTP) is immediately activated (that is, copied from RAM to FLASH and rebooted).

For consistency with the previous software version, IMMEDIATE=enabled is the default setting. If the IMMEDIATE SOFTWARE ACTIVATION feature is disabled, the software download (using MSR, Xmodem, Kermit, TFTP) is not activated (that is, not copied from RAM to FLASH and not rebooted).

You must activate the software at a later time by issuing a software download activation command from the System Utilities/Download Software/ RAM SOFTWARE OPTIONS selection field. When the software activation command is executed, the system copies the software image from RAM to Flash and reboots.

A system restart (power cycle) that occurs after the download, but before the activation, will not activate the new software. Loss of power causes the non-activated software download to be lost.

Download Destination (Local Unit, Remove Unit, Both Units)

This feature provides software to be loaded to either the local unit, the remote unit, or both. Use of the Remote or Both option requires use of the Xmodem or Kermit protocol.

A file image loaded to the remote unit is sent over the proprietary IMUX Embedded Data Link (EDL). The EDL is available regardless of the E1 line coding and framing.

To download to the Remote Unit, you do not log into the Remote; instead you select the download destination using the Download Destination field which allows a download to both units at once. It also minimizes disruption to the terminal interface session when the Remote Unit does an immediate software activation (which involves that unit's rebooting).

RAM Software Options

RAM Software Options - Query RAM Software

This feature determines when a valid software image exists in RAM by checking the CRC and image ID. The query indicates if the software can be activated in the unit.

The following response messages are possible:

RAM Image is valid. - CRC is valid, Image ID is valid

RAM Image is active - no reboot necessary. - CRC is valid, Image ID is valid, but images are identical.

RAM Image is invalid (Product ID Error) xxxxxx - CRC is valid, Image ID is xxxxxx.

RAM Image is invalid (Size too small) - Header indicated the code buffer is too small.

RAM Image is invalid (Size too big) - Header indicated the code buffer is beyond its range.

RAM Image is invalid (CRC error) - CRC is invalid.

The DL3800E unit image ID is reserved for use in a future application.

This command does not activate the software if it is downloaded and is pending activation, nor does it indicate the software revision of the downloaded image.

Querying the Remote Unit is performed by first logging into the remote unit from the Main Menu, then navigating to this menu.

RAM Software Options - Activate RAM Software

This feature activates downloaded software by copying the code from RAM to FLASH and then rebooting the unit. If a valid (that is, Image ID and CRC are valid) software image does not exist in RAM, the command fails and a reboot will not occur.

An extended loss of power causes the non-activated software download to be lost.

Modifying this setting in the Remote Unit is performed by first logging into the remote unit from the Main Menu, then navigating to this menu.

TFTP Software Download

If immediate software activation is enabled on the target unit, the software is downloaded to the target unit, and is activated by copying the code from RAM to FLASH and then rebooting.

A TFTP Software Download server is built into the DL3800E. This feature allows you to do an TFTP transfer (using the SLIP/NMS port) to the unit RAM. You issue the “Put” command to the unit to initiate the transfer. If you specify the remote unit IP address, the local unit forwards the TFTP packets to the remote unit.

Once the transfer is complete, activation is based on the setting of the Immediate Software Activation feature with the following results:

- If Immediate Software Activation is disabled on the target unit, the software is downloaded to the RAM of the target unit, but is not activated and a reboot does not occur.
- If Immediate Software Activation is enabled on the target unit, the software is downloaded to the RAM of the target unit, and is activated by copying the code from RAM to FLASH memory and then rebooting.

The performance of the TFTP data transfer is limited by the speed of the NMS/SLIP port, which has a maximum 38400 baud rate and the Embedded Data Link if the transfer is going to the remote unit. Only the “Put” TFTP server is functional; you cannot do a “Get” of the software from the unit.

Ensure that you specify binary mode instead of ascii mode in the TFTP client.

Delete Entire Unit Configuration (revert to factory config)



WARNING: This command will interrupt service.

Deleting the unit database causes the unit, and any other device's database within that unit, to be reset to the factory default setting. All device names will be erased, and all connections will be removed. The time and date, however, will remain the same, and the node number will be set to “0.00.00”.

As the warning states above, if there are any valid connections in the node, execution of this command will interrupt service.

To delete the entire unit configuration, select **DELETE ENTIRE UNIT CONFIGURATION** from the **SOFTWARE UTILITIES MENU**, and press **Enter**. Use the arrow keys to highlight the **Desired Action** field. Press the space bar until **RESET ENTIRE NODE DATABASE TO FACTORY DEFAULTS** appears in the field. The change must then be confirmed. Move the highlight bar to **CONFIRM**, and press the **Enter** key. Deleting the entire node configuration puts all parameters back to their Factory Default Settings.

From the **SOFTWARE UTILITIES MENU** (Figure 4-17 on page 4-36) you may also perform the following functions:

- Delete RAM code and Revert to ROM code
- Restart Node Software

```
Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

DELETE ENTIRE UNIT CONFIGURATION Exit

DESIRED ACTION: None

DO YOU REALLY WANT TO DO THIS? PLEASE CONFIRM:

Confirm
```

Figure 4-17 SOFTWARE UTILITIES MENU

Delete RAM Code and Revert to ROM Code

To delete RAM code and revert to ROM code, select **DELETE ENTIRE UNIT CONFIGURATION** from the **SOFTWARE UTILITIES MENU**, and press **Enter**. Use the arrow keys to highlight the **Desired Action** field. Press the space bar until **DELETE RAM CODE AND REVERT TO ROM CODE** appears in the field. The change must then be confirmed. Move the highlight bar to **CONFIRM**, and press **Enter**.

Restart Node Software

Restart Node Software resets the unit without powering down.

To Restart Node Software, select DELETE ENTIRE UNIT CONFIGURATION from the SOFTWARE UTILITIES MENU (Figure 4-17) and press **Enter**. Use the arrow keys to highlight the Desired Action field. Press the space bar until RESTART NODE SOFTWARE appears in the field. Confirm the change. Move the highlight bar to CONFIRM, and press **Enter**.

Login Configuration

This screen allows you to designate a NAME, PASSWORD and ACCESS PRIVILEGE LEVEL for up to eight users.

When the unit is shipped, the factory defaults for username and password are null. Pressing **Enter** bypasses both of these parameters until the first name and password are entered.

To access the LOGIN CONFIGURATION MENU, move the highlight bar to LOGIN CONFIGURATION in the NODE MAIN MENU and press **Enter**. Figure 4-18 is an example of the LOGIN CONFIGURATION MENU.

```
DIGITAL LINK DL3800E SR 3.00.22 NODE 1: 08/27/00 00:55:51 MJ
SELECTED DEVICE ADDRESS: 1.00.000 NAME:

LOGIN CONFIGURATION Exit Confirm

  USER IDENTIFICATION  PASSWORD  ACCESS TYPE(S)
1) Cole Porter         12CP          Full access
2) Arthur Fiedler     Arty1         Maintenance
3) Louie Armstrong    Satchmo       Provisional
4) Billie Holiday     LadyDay       Full access
5)                    No access
6)                    No access
7)                    No access
8)                    No access

TERMINAL AUTOMATIC LOGOUT: Off. (Must use Logout to return to login prompt).
TELNET AUTOMATIC LOGOUT: 5 minutes after no keyboard activity.
```

Figure 4-18 LOGIN CONFIGURATION MENU



NOTE: Name and Password are case-sensitive

Users must have Full Access class to view or change this screen.

The name and password can be any alphanumeric designation up to 16 characters in length. To enter a name or password, move the highlight bar to the appropriate line and column, and type in the alphanumeric designation. Move the highlight bar to CONFIRM, and press **Enter** to confirm the changes.

To designate the access privileges that a particular user is to be allowed, move the highlight bar to that column of the menu on your line and, using the space bar, toggle between the following options; FULL ACCESS, MAINTENANCE, PROVISION, PROVISION+MAINTENANCE, NO ACCESS, and DISPLAY ONLY.



NOTE: At least one user must have full access to the unit.

Table 4-8 Login Configuration Options

Parameter	Description
Full Access Class	View any menu and perform any function. It is the only access class where you are allowed to view the LOGIN CONFIGURATION MENU and assign names, passwords, and access levels to users. This user is also the only one who can change the SNMP Configuration, Download Software, or Delete Entire Node Configuration
Maintenance	Clears the event history log, clear statistics, and initiate tests.
Provision	Allows you to configure the DL3800E.
Provision + Maintenance	Allows you to perform all functions allowed Provision and Maintenance access described above.
Display Only	Allows you access to view-only screens. You are not allowed to make any changes or initiate tests.
No Access	Not allowed to access the menu screens.
Terminal Automatic Logout	Sets the Automatic Logout feature of the DL3800E. The unit will logout if no activity is detected for the amount of time configured. To change configuration, highlight the item and, using the Space Bar, toggle until your selection appears. Move the highlight to Confirm, and press Enter to confirm the change. The default is Off, with 15 sec., 30 sec., 1 min., three min., five min., 10 min. and 30 min. also configurable.



NOTE: If the you try to access a screen or perform a function beyond your allowed access level, the following message appears: Access denied - your account does not have this PRIVILEGE.

SNMP Configuration

Through the SNMP CONFIGURATION MENU, you configure the Network Manager (NMS) port on the rear panel of the DL3800E, setting various addresses and configurable items required for operation with an SNMP Network Manager. The DL3800E unit utilizes SLIP protocol over the RS232 port to communicate with the SNMP management station.

To access the SNMP CONFIGURATION MENU, move the highlight bar to SNMP CONFIGURATION in the CONFIGURATION MENU, and press **Enter**.

[Figure 4-19](#) is an example of the SNMP CONFIGURATION MENU, and [Table 4-9](#) describes the SNMP parameters:

```
DIGITAL LINK DL3800E SR 3.01.0B NODE 1:123 08/27/00 00:55:51 MJ
SELECTED DEVICE ADDRESS: 1.00.000 NAME:123

SNMP CONFIGURATION Exit Confirm
NMS SERIAL PORT (SLIP)
UNIT IP ADDRESS: 172.019.001.038 UNIT IP SUBNET MASK:255.255.255.000
TRAP IP ADDRESS: 0.000.000.000 Port: Slip
                  0.000.000.000 Port: Slip
                  0.000.000.000 Port: Slip

REMOTE IP ADDRESS: 0.000.000.000
SLIP TRAP DELAY: 0seconds REMOTE TRAP DELAY: 0 seconds

READ COMMUNITY STRING: public
WRITE COMMUNITY STRING: public
TRAP COMMUNITY STRING public

SNMP BAUD RATE: 9600
SNMP #BITS AND PARITY: 8 bits, No parity
SNMP STOP BITS: 2 bits
```

Figure 4-19 SNMP CONFIGURATION MENU

Table 4-9 SNMP Configuration Options

Option	Description/Action
Unit IP Address	<p>The Unit IP Address is a 32-bit quantity which uniquely identifies the node in the IP network. This address is used by the SNMP manager to access information from the node.</p> <p>To set or change the Unit IP Address, move the highlight bar to <code>Unit IP Address</code>, and enter a 32-bit quantity. Press Enter when finished.</p>
Unit IP Subnet Mask	<p>The Unit IP Subnet Mask is a 32-bit quantity that identifies which bits in the IP address identify the physical network.</p> <p>To set or change the Unit Subnet Mask, move the highlight bar to <code>Unit Subnet Mask</code>, and enter a 32-bit quantity. Press Enter when finished.</p>
Trap IP Address	<p>The Trap IP Address is a 32-bit quantity that identifies the SNMP manager, the address to which the node sends any event messages.</p> <p>You can specify up to three different IP addresses.</p> <p>To set or change the Trap IP Address, move the highlight bar to <code>Trap IP Address</code>, and enter a 32-bit quantity. Press Enter when finished.</p>
Read Community String	<p>This alphanumeric identifier, up to 31 characters in length, identifies a portion of the SNMP network that is able to read messages from the node.</p> <p>To set or change the Read Community String, move the highlight bar to <code>Read Community String</code> and enter an alphanumeric identifier, up to 31 characters in length. Press Enter when finished.</p>
Write Community String	<p>This alphanumerical identifier, up to 31 characters in length, identifies a portion of the SNMP network that can write messages to the node.</p> <p>To set or change the Write Community String, move the highlight bar to <code>Write Community String</code>, and enter an alphanumeric identifier, up to 31 characters in length. Press Enter when finished.</p>
Trap Community String	<p>This alphanumeric identifier, up to 31 characters in length, identifies a portion of the SNMP network that is able to receive event messages from the node.</p> <p>To set or change the Trap Community String, move the highlight bar to <code>Trap Community String</code>, and enter an alphanumerical identifier. Press Enter when finished.</p>

Table 4-9 SNMP Configuration Options (Continued)

Option	Description/Action
SNMP Baud Rate	<p>This feature selects the SNMP port's baud rate.</p> <p>To set or change the SNMP port baud rate, move the highlight bar to <code>SNMP Baud Rate</code>, and press the Space Bar to toggle between the options until the desired speed appears. The options are: 300; 600; 1200; 2400; 4800; 9600; 19,200 and 38,400. (Default - 9600)</p> <p>If the SNMP Baud rate is changed, it is necessary to change the baud rate at the connection to the SNMP manager before continuing. The same is true for modifying the parity and/or number of stop bits.</p>
SNMP Bits & Parity	<p>This feature selects the SNMP port's parity.</p> <p>To set or change the SNMP Parity, move the highlight bar to <code>SNMP Bits & Parity</code>, and press the Space Bar to toggle between the options until the desired parity appears. The options are: None, Odd, and Even. Bits is always set at 8. (Default - None)</p>
SNMP Stop Bits	<p>This feature selects the SNMP manager stop bit requirement. Move the highlight bar to <code>SNMP Stop Bits</code>, and press the Space Bar to toggle between the options 1, 1.5, or 2. (Default-2)</p>

To update the SNMP database with all the changes made, move the highlight bar to `CONFIRM`, and press the **Enter** key. Changes can be confirmed after each change or after all changes have been made.

IP Bridging to a Remote Unit

The IMUX unit now supports bridging of selected IP packets to the remote IMUX unit. The bridged packets are transported between the remote unit and the local NMS/SLIP port using the proprietary Embedded Data Link. In order to minimize bandwidth constraints, only the following protocols are bridged:

- SNMP
- Ping (ICMP Echo Request/Echo Response, a subset of full ICMP)
- TFTP
- SNMP Traps from remote

The illustration below shows the SNMP Configuration from the `SYSTEM UTILITIES MENU`.

The IMUX unit has a configurable "Remote IP Address" parameter used to identify the remote unit. The remote IMUX's "Unit IP Address" parameter should be set to the same value, although this is not strictly necessary.

However, it is important to note that the remote IMUX's "Unit IP Address" parameter must be set to some non-zero value in order to respond to the bridged IP packets.

SNMP trap packets from the remote IMUX unit are modified upon receipt. The source IP address field in the trap packet is modified to the "Remote IP Address" parameter; then the packet is forwarded out the NMS/SLIP link.

In-Band SNMP to Remote

This feature allows you to manage both local and remote units with a single NMS station attached to only one of the two units.

If the unit receives an SNMP packet from its SLIP port with the IP address of the remote unit, the local unit forwards the packet to the remote unit over the Embedded Data Link.

If the unit receives an SNMP packet that does not match its IP address or the IP address of the remote unit, the packet is discarded.

The unit responds to SNMP packets with its IP address from an NMS with any IP address.

The unit transmits SNMP responses from either its SLIP port or to the remote unit depending on the direction from which the packet came.

The IP address of the remote unit must be set to a non-zero value for this feature to work. This field is shown in [Figure 4-19 on page 4-39](#).

Save Configuration

This option allows you to manually backup the database to EEPROM at any time. To SAVE CONFIGURATION and backup the database to EEPROM, highlight SAVE CONFIGURATION in the SYSTEM UTILITIES MENU, and press the **Enter** key.

Tests

The TESTS MENU allows you to initiate or stop four types of loopbacks for each individual network port: DTE/NETWORK LOOPBACK for the DTE, PAYLOAD LOOPBACK, LINE LOOPBACK, and LOCAL LOOPBACK. For troubleshooting suggestions see [“Troubleshooting the DL3800E” on page 6-3](#).

To access the TESTS MENU, move the highlight bar to TESTS in the DL3800E unit Main Menu, and press **Enter**.

[Figure 4-20](#) is an example of the TESTS MENU. The individual loopbacks and operation of the menu are described below in the text following the menu.

```
Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
  Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
  Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:

DTE AND NETWORK TESTS      Exit  Confirm

DTE TESTS:
  DTE/NETWORK LOOPBACK:  Off

NETWORK TESTS:

  PORT#          PAYLOAD LOOPBACK    LINE LOOPBACK    LOCAL LOOPBACK
  1             Off
  2             Off
  3             Off
  4             Off
  5             Off
  6             Off
  7             Off
  8             Off
```

Figure 4-20 TESTS MENU

To initiate a test, use the CURSOR keys to move the highlight bar to DTE/Network Loopback or a Payload or Line Loopback on a selected port. Use the space bar to toggle between OFF and ON until ON appears in the display. When that selection appears in the display, move the highlight bar to CONFIRM, and press the **Enter** key. To cancel a test that is running, move the highlight bar to DTE/Network Loopback. Use the space bar to toggle between the options until OFF appears in the display. Move the highlight bar to CONFIRM, and press the **Enter** key.

DTE/Network Loopback

The DTE/NETWORK LOOPBACK is a bi-directional loopback that loops the received DTE signal back to the DTE and the signal from the E1 processor back towards the E1 network. This loopback is used to verify the operation of the DTE and associated cabling.

Payload Loopback

The payload loopback is used to verify proper E1 network operation of the DL3800E unit and the E1 network. The Payload Loopback loops the payload data received from the E1 network back towards the network. The data is regenerated, and a new framing pattern is inserted prior to being looped back. In this way the E1 framing of the unit and network can be verified.

Line Loopback

The line loopback is used to verify the operation of the E1 network. The line loopback loops the data received from the E1 network back towards the network. The data is regenerated prior to being looped back; however, no additional processing of the data is done by the DL3800E. This minimizes the impact of the DL3800E unit during this test so that network problems can be isolated.

Local Loopback

The local loopback is used to verify the operation of the DTE and connections. The local loopback loops the data received from the DTE back towards the DTE at the network interface.

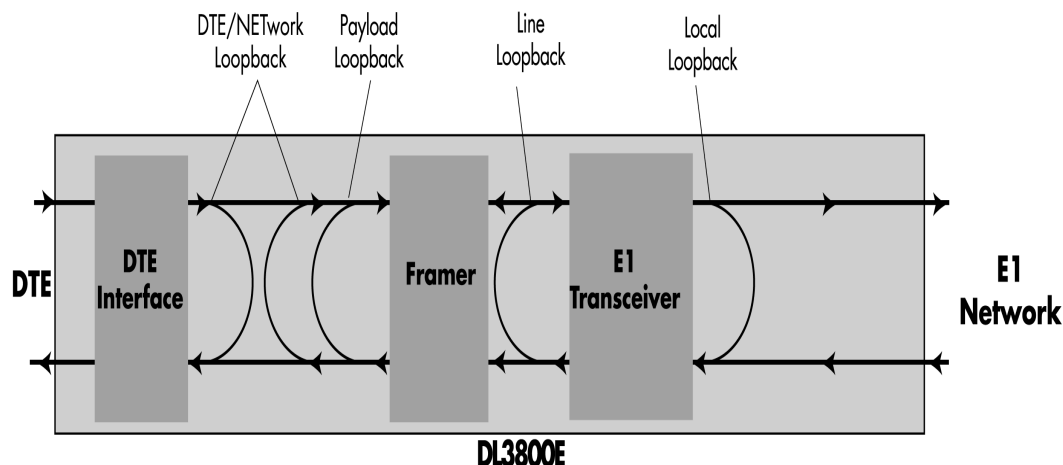


Figure 4-21 Loopbacks within the DL3800E unit

Remote Loopback Detection

The DL3800E has the capability of detecting loopbacks which are set on the remote 3800E or somewhere in the network line. When a remote loopback is detected, the 3800E removes the port from the DTE data bundle and reduces the DTE data rate, sets the port LED to yellow and changes the port status in the Alarms & Status menu to read "Remote Lpbk". It also generates an SNMP alarm: enRemoteLpAlarm.

When the remote loopback is cleared, the port is restored to DTE bundle and LED is restored to green. Port loopback status is cleared and the SNMP alarm (enRemoteLpAlarm) is idled.

This loopback detection has some limitations. It will not work when a Unit Number of zero is set (factory default). Also, false remote loopback conditions will be reported on all ports if the remote Unit Number is the same as the local Unit Number



NOTE: Remote loopback detection is disabled when the net is configured for "Install/Test Only."



WARNING: The E1 Loopback tests will result in removal of the E1 port from service unless the port is configured for “Install/Test Only” mode. In this mode, a port in loopback will remain in service, which will disrupt traffic.

Manual Network Restoration

The DL3800E’s E1 ports are normally set to auto restore. However, you may choose to individually restore E1 networks after they fail, through the MANUAL NETWORK RESTORATION MENU.



NOTE: Manual restore will only work under the following conditions:

1. If the port has previously been set to “Use w/manual restore,” in the Network Configuration screen.
2. If the E1 is *not* in alarm. If the E1 is in alarm, you must first clear the alarm statistics in the STATISTICS MENU. To learn how to clear alarm statistics, see “Statistics” on page 4-11.

To access the MANUAL NETWORK RESTORATION MENU ([Figure 4-22 on page 4-47](#)) move the highlight bar to Manual Network Restoration in the CONFIGURATION MENU, and press **Enter**.

```
Major 01/01/90 04:58:17 Unit: 0 NET : 2 (114)
      Network 15 Minute UAS Major Threshold Exceeded
Major 01/01/90 04:58:17 Unit: 0 NET : 1 (114)
      Network 15 Minute UAS Major Threshold Exceeded
DIGITAL LINK DL3800E SR 2.00.00 NODE 7: 01/01/90 05:55:07 MJ
SELECTED DEVICE ADDRESS: 7.00.000 NAME:
You must confirm to save changes.
MANUAL NETWORK RESTORATION Exit Confirm

PORT# RESTORE
1      No Change
2      No Change
3      No Change
4      No Change
5      No Change
6      No Change
7      No Change
8      No Change
```

Figure 4-22 MANUAL NETWORK RESTORATION MENU

To manually restore an E1 port (network), use the UP and DOWN ARROW keys to highlight the line item of the corresponding network port number. Toggle from No Change to Restore using the **Space Bar**. Select Confirm, and press the **Enter** key to save the changes.

Logout

This allows you to manually log off the unit, instead of waiting for the provisioned automatic logoff time for the unit to log off automatically. Highlighting LOGOUT and pressing **Enter** logs you off the system.

5

Front Panel Interface

GENERAL

The front panel (Figure 5-1) features a 16 character vacuum fluorescent display and four buttons that help you to move through the various menus to configure the unit, perform tests, and obtain vital performance data. The front panel also features six LEDs for the DTE port, one for each of the E1 networks, three for the DL3800E unit status and one for Network Test.

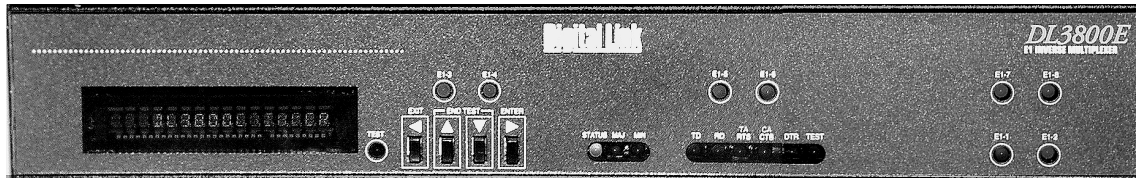


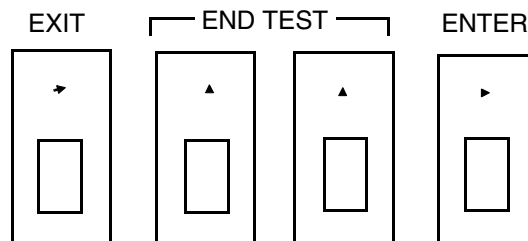
Figure 5-1 DL3800E Front Panel

DISPLAY OVERVIEW

The DL3800E unit has a 16-character fluorescent front panel display. The left most character often provides an indication when the displayed message relates to a remote unit. A remote unit message is indicated by the character R followed by a comma (R,). When displaying a message relating to the local unit, this character position is a blank.

BUTTON OVERVIEW

The DL3800E unit has four front panel buttons. The unit generally responds to a button when it is pressed. Pressing and holding a button results in a repeating action after one-half second.



The front panel buttons are also used for Alarm Cutout. When an alarm condition occurs, the External Alarm Output contacts close. This typically actuates external alarm indicators such as bells or alarm lights. Pressing any of the four front panel buttons clears the condition, and turns off the external bell or light.

Exit Button

The **EXIT** button is used to cancel operations or exit to a higher level menu loop from a submenu loop. This button doubles as a left arrow button in a few situations.

UP ARROW and DOWN ARROW Buttons

The UP ARROW button is used to move to the previous menu item or configuration option.

The DOWN ARROW button is used to move to the next menu item or configuration option.

Pressing both the UP ARROW and the DOWN ARROW buttons simultaneously (the End Test combination), terminates all active tests on the local unit and brings the front panel menu to the TEST MENU showing the test that has just been terminated. If no tests are active, pressing the End Test combination has no effect.

Enter Button

The **ENTER** button is used to select a submenu loop or configuration option. This button doubles as the right arrow button in a few situations.

Front Panel LEDs

Table 5-1 Front Panel LEDs

Indication	Description
Test	Test In Progress LED
Off	No tests are in progress.
Solid Red	A test condition exists.
Data Port LEDs	
TD	Data DTE Activity LED. Represents pulses to DTE.
Green	Pulses are being detected.
Off	No pulses are being detected.
RD	Date DTE Activity LED. Represents pulses from DTE.
Green	Pulses are being detected.
Off	No Pulses are being detected.
RTS/TA	Request to send indicator, from DTE or TA (HSSI)
Yellow	RTS from DTE is active.
Off	RTS has been removed.
CTS/CA	Clear To Send indicator, to DTE or CA (HSSI)
Yellow	CTS to DTE is active.
Off	CTS has been removed, indicating that the DL3800E unit is not sending valid data.
DTR	Data Terminal Ready Indicator (N/A for HSSI)
Yellow	DTR from DTE is active.
Off	DTR from DTE is inactive.
Test	Indicates the port is in test mode.
<p>NOTE: The Test LED is off only when the port is not allocated bandwidth. It lights red when there is a HW DTE Loopback or DTE/NET Loopback in progress. It is connected to the TEST lead going from the DL3800E unit to the DTE, so both the LED and the lead carry the same data</p>	
Network LEDs (T-1 through T-8)	
Red	Network is in Red Alarm.
Green	Network is Active and running.
Flashing Green	The network is ready, but it is not part of the bundle to the DTE.

Table 5-1 Front Panel LEDs (Continued)

Indication	Description
Flashing Green	Network crossover is detected.(Check Front panel Display Menu)
Yellow	Network is in Loopback.
Flashing Yellow	Receiving yellow/AIS alarm.
Off	Network is inactive.
Unit LEDs: Status Maj Min	Display the status of the DL3800E, and whether the condition is a Major or Minor alarm. When a port's Active/Restore mode is set to <code>Never Use</code> and its alarm mode is set to <code>Mask</code> , then the port LED will be turned off.

Access Levels And Protected Mode

Front panel access can be limited by placing the DL3800E unit in the Protected Mode. In this mode, you can use the Front Panel User Interface only to monitor the status of the unit and its Error Counters, and view its configuration. The following operations cannot be performed through the Front Panel User Interface when the unit is in Protect Mode:

- Clearing the Error Counters.
- Changing the unit configuration.
- Starting or terminating diagnostic tests.

The unit can be put into and out of Protected Mode through the Terminal User Interface, but not from the Front Panel User Interface. To place the unit in protect mode, toggle the Front Panel field to Off, in the UNIT CONFIGURATION MENU. Refer to [“Unit Configuration” on page 4-17](#).

When a user needs to take a unit out of Protected Mode but a terminal is not available, the following procedure can be used:

1. Turn off the power to the unit.
2. Press EXIT and the DOWN ARROW buttons at the same time.
3. Turn the power to the unit back on.



NOTE: The unit automatically performs a self test every time the unit is powered up.

This procedure takes the unit out of the Protected Mode (and clears any password that may have been programmed) and sets all parameters to their default settings. To allow you to perform this procedure when the unit is in protected mode, the Protected Mode is ignored in the first sixty seconds after powering up. When in Protected Mode, the TEST MENU does not appear in the Main Menu.

POWER UP AND RESET

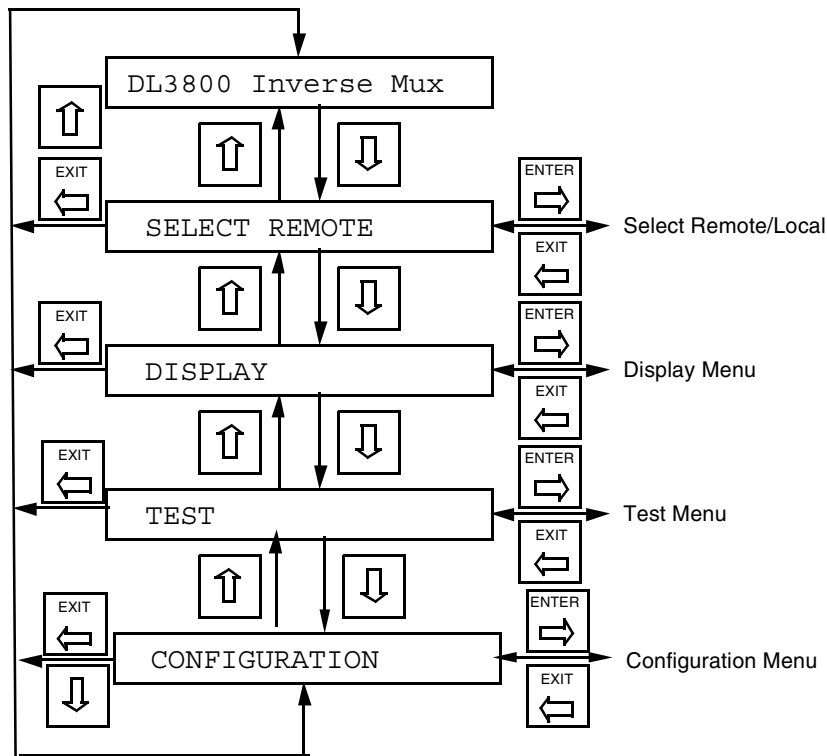
During power up initialization, the unit performs self test and displays a self-test message. Payload service resumes at the completion of Self Test. When the Self Test message is removed, the default message DL3800E Inverse Multiplexer appears on the display.

TOP MENU



NOTE: The menu system in the DL3800E unit is consistent with other Quick Eagle Networks products. Therefore, a user familiar with an existing product can easily operate the DL3800E. An example of a menu tree is shown below:

The TOP MENU loop consists of five items: (1) DL3800E Inverse Multiplexer designation, (2) Select Remote/Local, (3) MONITOR MENU, (4) TEST MENU, and (5) CONFIGURATION MENU.



This menu loop may also be entered at any time by pressing the **Exit** button to go up the menu hierarchy until reaching the TOP MENU. Continuing to press **Exit** while in the TOP MENU brings the unit to the default display DL3800E INVERSE MULTIPLEXER scrolling across the screen. Pressing the UP and DOWN ARROW buttons get you into the menu loop. A menu is selected by pressing **Enter** when the menu name appears on the display.

The DISPLAY MENU is used for displaying Node Status, DTE Status, and Status of each installed E1 network. The 24-hour line data is only available with the terminal interface or through the Network Manager. The data in the DISPLAY MENU is a subset of the parameters that are available on the ALARM AND STATUS MENU through the terminal interface, or the Network Manager.

The TEST MENU is used for DTE and Network loopbacks. The DL3800E unit does not allow performing tests on the remote unit through the front panel user interface. This feature is only available with the terminal interface.

The Configuration MENU is used to view and change the unit's configuration parameters, date and time, network interface parameters, and DTE interface parameters.

Both the DISPLAY and CONFIGURATION MENUS are also able to access the remote unit. Remote monitoring and configuration are only available when there is an EML (*Embedded Maintenance Link*) channel to the remote unit. When you request status or configuration information from the remote unit, the local unit sends a request to the remote unit over ADL, and waits for a reply. While waiting for the reply, the local unit displays the message:

```
PLEASE WAIT...
```

On the front panel. If there is no reply from the remote unit within 10 seconds, the display of the local unit will show:

```
REMOTE NOT AVAILABLE
```

Otherwise, the information reported by the remote unit will be displayed.

SELECT REMOTE/SELECT LOCAL

Pressing the DOWN ARROW cursor button when the default message is in the display brings the message SELECT REMOTE or R, SELECT LOCAL to the display. This allows you to log onto either the local or remote DL3800E.

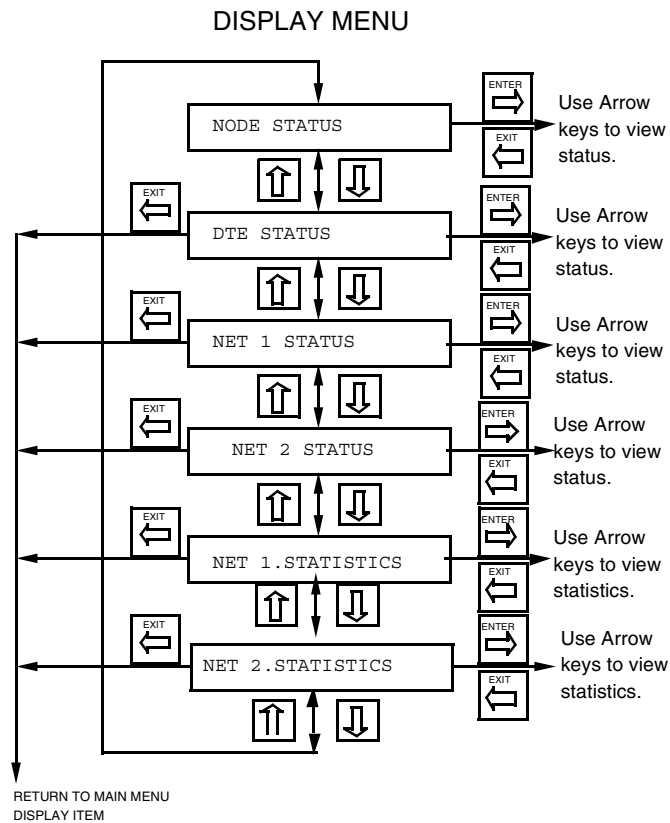
When logged onto the local unit it displays SELECT REMOTE. When logged onto the remote unit, the display will read R, SELECT LOCAL. To change the DL3800E unit being monitored and controlled, press **Enter**. The message in the display blinks. Press **Enter** once again to change from SELECT REMOTE to R, SELECT LOCAL or visa versa.



NOTE: When logged onto the remote unit, an R, will appear as the first two characters in the display For example: R,NET1 STATISTICS

DISPLAY MENU

The DISPLAY MENU is used for displaying Node status, DTE status and the status of each installed E1 line. It is also used to clear the error counters (Clearing the error counters can only be done when the DL3800E unit is not in the Protected Mode).



NOTE: Only those E1 circuits physically installed (from two to eight) will have status lines in this menu.

Node (Common Equipment) Status

This display shows the status of the unit. NODE STATUS is accessed from the DISPLAY MENU by pressing **Enter** when NODE STATUS appears in the display.

If one or more errors are detected, one or more of the following messages will appear. Use the UP and DOWN ARROW buttons to view the following messages, see [Table 5-1 on page 5-9](#) for a list of those Common Equipment Alarm and Status items that could appear in this menu.

DTE Status

The next display shows the status of the DTE data port. The menu is accessed by pressing **Enter** when DTE STATUS appears in the display.

If errors are detected, one or more of the following messages will appear. Use the down and UP ARROW buttons to view further messages.

See [Table 4-2 on page 4-5](#) for a list of those Common Equipment Alarm and Status items that could appear in this menu.

NET (1-8) Status

The next eight displays show the status of the E1 Networks (NET 1 STATUS through NET 8 STATUS if all are installed). Use the UP and DOWN ARROW buttons to select the E1 Network to be monitored and press **Enter**. Use the UP and DOWN ARROW buttons to view further status items relating to the same E1 circuit.

See [Table 4-2 on page 4-5](#) for a list of those Common Equipment Alarm and Status items that could appear.

NET (1-8) Statistics

The menu provides you with the various performance statistics of the individual E1 circuits. These performance statistics are listed and defined in [Table 5-3](#). To view the statistics of a particular E1 circuit, press **Enter** when the display reads NET N. STATISTICS, where N is the number of the desired E1 network port.

The following table lists and explains the information that can be viewed from the NET STATISTICS MENU, for each performance statistic:

Table 5-2 NET STATISTICS MENU Information Display

Front Panel Display	Explanation
NET N XXX	XXX = the performance statistic. N = the E1 network port (1-8).
SEC YYY VALID. Z	YYY = the number of seconds into the current interval. Z = the number of valid 15 minute intervals since the error counters were reset (0-96).
CUR. X	X = the error count within a statistics period.
TOTL. X	X = the number of errors in the current interval.

Pressing the DOWN ARROW from any of these displays will step you through the last 96 15-minute intervals while displaying the number of errors in each of the interval. From the Net STATISTICS MENU, press **Enter**. When you see Net N CV, press **Enter** again. The first display will read SEC. 455 VALID.8, showing the number of seconds in the current interval, and the number of valid 15 minute intervals since the error counters were last reset.

Pressing the DOWN ARROW button from this point in the menu will show the number of Code Violations in the current interval (CUR 4). Pressing the DOWN ARROW will display the total number of errors since the registers were last reset (TOTL. 8). Pressing the DOWN ARROW from here will cycle you through the last 96 fifteen-minute intervals (or however many intervals exist since the counters were last reset), displaying the number of Code Violations in each interval, starting with the most recent, i.e., 1 = 0.

The NET STATISTICS items are listed in [Table 5-3](#).

Table 5-3 NET Statistics Items

Parameter	Definition
EFS	Error Free Seconds (EFS) is calculated whenever ESR is calculated, and is the simple percentage complement of ESR: $EFS = 100.0 - ESR$. When there have been UAS in the statistics history for the past 24 hours, then EFS is set at 100%.
ESR	Errored Second Ratio (ESR) is the ratio of ES to total seconds in available time during a fixed measurement interval. The fixed interval is the last 24 hours before the current 15 minute interval. When there have been UAS in the statistics history for the past 24 hours, then ESR is set at 0%.
SESR	Severely Errored Second Ration (SESR) is the ratio of SES to total seconds in available time during a fixed measurement interval. The fixed interval to be used is the last 24 hours before the current 15 minute interval. When there have been UAS in the statistics history for the past 24 hours, then SESR is set at 0%.
BBER	Background Block Error Ratio (BBER) is the ratio of errored blocks to total blocks during a fixed measurement interval, excluding all blocks during SES and unavailable time. The fixed interval is equal to the last 24 hours before the current 15 minute interval.
BPV	This display provides the number of Bipolar Violations (BPVs) that have occurred during the accumulation period. A total of 15430 BPVs in a 10 second sliding window (approximately 10-3) will create a Major Alarm and 916 BPVs in a 600 second sliding window (approximately 10-6) will create a Minor Alarm.
FE	A Frame Error (FE) is declared when two out of four consecutive framing bits are in error. Typically, an FE indication will be accompanied by a significant number of payload data bit errors. This display provides the number of FEs that have occurred in the accumulation period.

Table 5-3 NET Statistics Items (Continued)

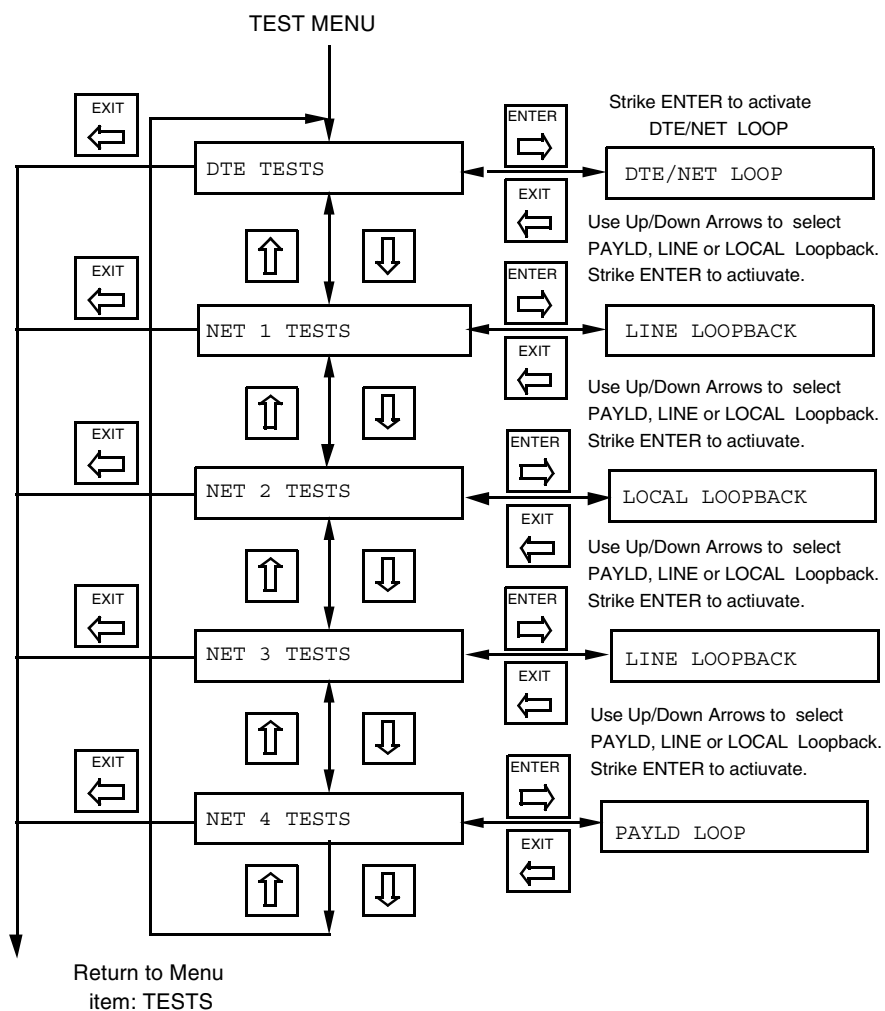
Parameter	Definition
EB/CV	<p>An Errored Block (EB) is a block in which one or more bits are in error. The EB is therefore equivalent to the Code Violation (CV) count calculated and displayed in the previous versions of the DL3800E. This count allows a user to monitor the rate of EB faults on a line that is unavailable.</p> <p>EBs are counted in the unavailable state; ES, SES, and BBE are not counted in the unavailable state.</p>
ES	<p>An Errored Second (ES) is a one second period with one or more errored blocks (such as one or more CRC4 errors) or an Out Of Frame (OOF). This display provides the number of ESs that have occurred in the accumulation period. ESs are not accumulated during UAS.</p>
SES	<p>Severely Errored Seconds (SES) is a one-second period which contains 30% or more errored blocks or at least one severely disturbed period (SDP). An SDP is present if either a LOS, AIAS, or LOF occurs.</p> <p>Since there are 1000 blocks per second, an SES is a one second period which contains either a combination of 300 or more CRC4 errors, an OOF, or at least one of the following: LOS, AIS, or LOF. This requirement is a slight change from the prior DL3800E unit SES definition, which required 320 or more CRC4 errors or LOS, AIS, or LOF. SESs are not accumulated during UAS.</p>
BBE	<p>A Background Block Error (BBE) is an errored block not occurring as part of an SES. A BBE is calculated and displayed as a raw count of non-SES EBs. The count is updated at the end of every measurement second excepting any second that is an SES. The updated count is discarded for all UAS.</p>
UAS	<p>Unavailable Seconds. This display provides the number of UAS that have occurred in the accumulation period. At the onset of 10 consecutive SES events, a period of unavailable seconds begins. These 10 seconds are part of the unavailable seconds count. At the onset of 10 consecutive non-SES events, a new period of available time begins. These 10 seconds are part of available time.</p> <p>UAS only occurs at the onset of 10 SES.</p> <p>ES, SES, and BBE are not counted during unavailable time. Rate parameters ESR, SESR, and BBER are the ratio of the fault-seconds count to the total seconds in available time.</p>

TEST MENU

The TEST MENU is used to activate network loopbacks and DTE loopbacks. The TEST MENU is only available when the unit is not in the Protected Mode. Tests are performed by selecting a test from the TEST MENU or one of the TEST submenus, and pressing **Enter**. To end all tests, press the END TEST button combination (UP and DOWN ARROW buttons simultaneously). When a test is selected that could apply to an E1 port, you are asked to specify to which fraction the test should apply. Only the local unit can be tested from the front panel. Testing the remote unit is limited to placing it in the Network Loopback Test.

The TEST MENU is broken down into two types of submenus: DTE TESTS (one menu) and NETWORK TESTS (one for each network interface installed). Through these submenus, you initiate and stop various tests and loopbacks.

The TEST MENU is accessed from the Main Menu by pressing **Enter** when TEST appears in the display. Pressing the down or UP ARROW button toggles through the three submenus. The submenus are accessed by pressing **Enter** when the appropriate menu appears in the display.



NOTE: A menu item will appear only for those E1 network interfaces installed.

DTE TESTS

Only one loopback can be initiated through the DTE TESTS MENU, a bi-directional DTE/NET Loopback.

To access the DTE TESTS MENU from the TEST MENU, press **Enter** when DTE TESTS appears in the display.

When in the DTE TEST MENU, pressing **Enter** accesses the DTE/NET Loopback.

DTE/NET Loopback

The DTE/NET LOOPBACK is a bi-directional loopback that loops the received DTE signal back to the DTE and the signal from the E1 Main Board back towards the E1 Main Board. This loopback is used to verify the operation of the DTE and associated cabling, the DTE Board, and the link between the DTE Board and the E1 Main Board.

To initiate a DTE/NET LOOP from the DL3800E unit front panel, press **Enter** when DTE/NET LOOP appears in the display.

When a DTE/DTE LOOP is in operation, a “plus sign” will appear after DTE/NET LOOP in the display:

DTE/Net Loop +

To end the loopback, press **Enter** again while still in the DTE/NET LOOPBACK MENU.

To cancel a test or loopback from any place in the Menu, press the **END TEST** button combination. However, this will cancel all tests and loopbacks currently in progress.

Only one test can be performed at a time. To start a new test, the previous test must first be terminated.

Use the **Exit** button to go out of the TEST MENU. Use the other buttons to go into the MONITOR or the CONFIGURATION MENUS to view the performance information or view and change the configuration of the unit while the test is in progress.

While the test is active, the front panel **TEST** LED is on, reminding you that the unit is out of normal service condition. The test is terminated by pressing the **END TEST** button combination at any point in the menus. When this combination is pressed, the currently active test is canceled and the front panel display returns to the TEST MENU to the test that was just terminated.

Network Tests (1-8)

Three NETWORK TESTS can be performed through this menu: PAYLOAD (PAYLD) LOOPBACK, LINE LOOPBACK and LOCAL LOOPBACK. To access NETWORK TESTS MENU from the TEST MENU, press **Enter** when NETWORK TESTS MENU for a particular E1 circuit (NET 1 through NET 8) appears in the display.

When in a NETWORK TEST MENU, pressing the UP or DOWN ARROWs toggle between the three options, PAYLD, LINE, and LOCAL LOOPBACK.

Payload Loopback

The PAYLOAD LOOPBACK on the DL3800E unit is used to verify the proper operation of the E1 network and the DL3800E.

To initiate a PAYLOAD LOOPBACK from the DL3800E, press **Enter** when PAYLD LOOPBACK appears in the display for the E1 (NET 1 through NET 8) line to be looped back.

When a PAYLOAD LOOPBACK is in operation, a plus sign will appear after the words PAYLD LOOPBACK in the display.

Payload Loopback +

When the loopback is terminated, the “plus sign” disappears.

To end the loopback, press **Enter** again while still in the PAYLD LOOPBACK MENU.

Line Loopback

The Lineloopback is used to verify the operation of the E1 network connection (E1 through E8). The line loopback loops the data received from the E1 network back towards the network. The data is regenerated prior to being looped back, however, no additional processing of the data is performed by the DL3800E. This minimizes the impact of the DL3800E unit during this test so that the problems can be isolated.

To initiate a LINE LOOPBACK from the DL3800E, press **Enter** when LINE LOOPBACK appears in the display.

When a LINE LOOPBACK is in operation, a “plus sign” will appear after the words LINE LOOPBACK in the display as shown below:

```
Line Loopback  +
```

To end the loopback, press **Enter** again while still in the LINE LOOPBACK MENU. When the loopback is terminated, the plus sign disappears.



NOTE: PAYLOAD and LINE LOOPBACKs will result in removal of the looped port from service, unless the port is configured for “Install/Test Only” mode.

Local Loopback

The local loopback is used to verify the operation of the DTE and connections. The local loopback loops the data received from the DTE back towards the DTE at the network interface.

To initiate a LOCAL LOOPBACK from the DL3800E, press **Enter** when LOCAL LOOPBACK appears in the display.

When a LOCAL LOOPBACK is in operation, a “plus sign” will appear after the words LOCAL LOOPBACK in the display as shown below:

```
Local Loopback  +
```

To end the loopback, press **Enter** again while still in the LOCAL LOOPBACK MENU. When the loopback is terminated, the “plus sign” disappears.

You can cancel a test or loopback from any place in the menu by pressing the UP ARROW and DOWN ARROW at the same time. However, this will cancel all tests and loopbacks currently in progress.

CONFIGURATION MENU

The CONFIGURATION MENU is used to back up the database and to view and change the unit and Comm Port Configuration parameters, network interface parameters, and DTE interface parameters. The remote unit configuration may also be viewed and changed.

The DL3800E unit configuration can only be changed when the unit is not in the Protected Mode. In Protected Mode the configuration can only be viewed but not changed. To use the CONFIGURATION MENU, you select the configuration submenu from a hierarchical list, and presses **Enter**. You then proceed through the hierarchical menu structure to view or change the chosen parameters. When finished with the CONFIGURATION MENU, press **Exit**.

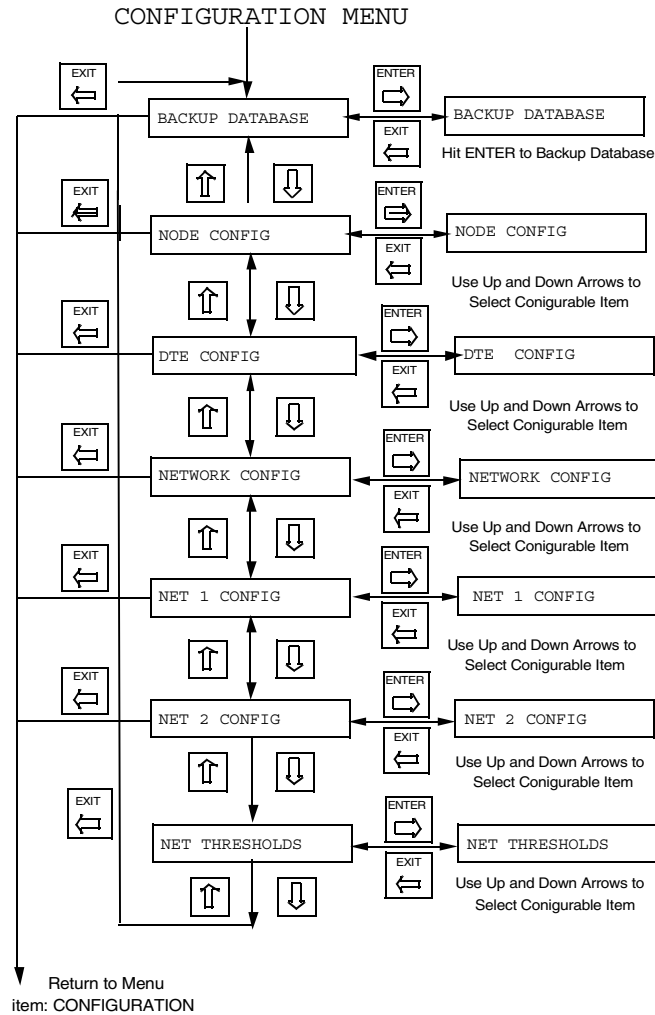


Table 5-4 CONFIGURATION MENU Items

Menu	Definition
Backup Database	Used to manually backup the database to EEPROM
NODE CONFIG MENU	Used to set the unit's ID, date, time, and communications port. It also shows you the hardware and software versions
DTE CONFIG MENU	Used to set the line mode for the DTE DATA port. It is also used to define whether the DTE signal is defined missing when the DTR and the RTS line is not asserted. Other options include DTE/DCE mode, V.35/RS449/X.21, and clocking option (SCTE/SCT Normal or SCT Invert)

Table 5-4 CONFIGURATION MENU Items (Continued)

Menu	Definition
NETWORK CONFIG MENU	Used to set the operating mode (Inverse Mux or Single Line DSU), and clocking options of that are common to all E1 Network Ports.
NET N CONFIG MENU	Used to set various configurable items that are unique to each individual E1 Network Port, including Framing Format, TS16, Alarm Reporting, Auto-Restore, and Equalization.
NET THRESHOLDS MENU	Allows you to enable/disable and set the values of the various Network Alarm Thresholds which, when exceeded, will cause the E1 lines to automatically be taken out of service.

Node Configuration

The NODE CONFIG MENU allows you to configure the NODE ID, NODE NUMBER, DATE & TIME and *NODE COMM PORT (Terminal). It also displays the NODE HW REV and the SOFTWARE REV, which are set by the factory.

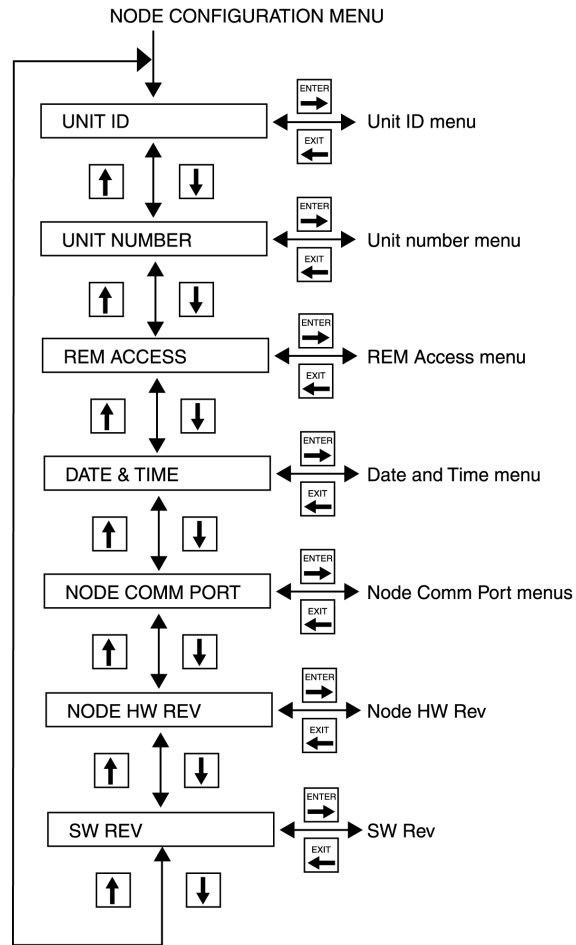


NOTE: Only the terminal comm port can be set through the front panel. The network management port is set through the ASCII terminal.

The NODE CONFIG MENU is accessed through the CONFIGURATION MAIN MENU by pressing **Enter** when NODE CONFIG appears on the display. Pressing the DOWN ARROW or UP ARROW button toggles through the submenus.

Pressing **Enter** when a selection is in the display allows you to view the present configuration. Pressing **Enter** again will cause the entry to start blinking and allows you to change the selection if desired.

To change the selection, use the DOWN ARROW and UP ARROW buttons to toggle through the choices. Pressing **Enter** selects the option that's in the display as the configuration. In the case of changing names and numbers, only one number or letter will “blink” at a time. Only that number or letter can be changed. After each letter or number is selected, press **Enter** to confirm each change. The next letter or number space will then begin “blinking” and be available for change. To abort any change, press **Exit** before you press **Enter**.



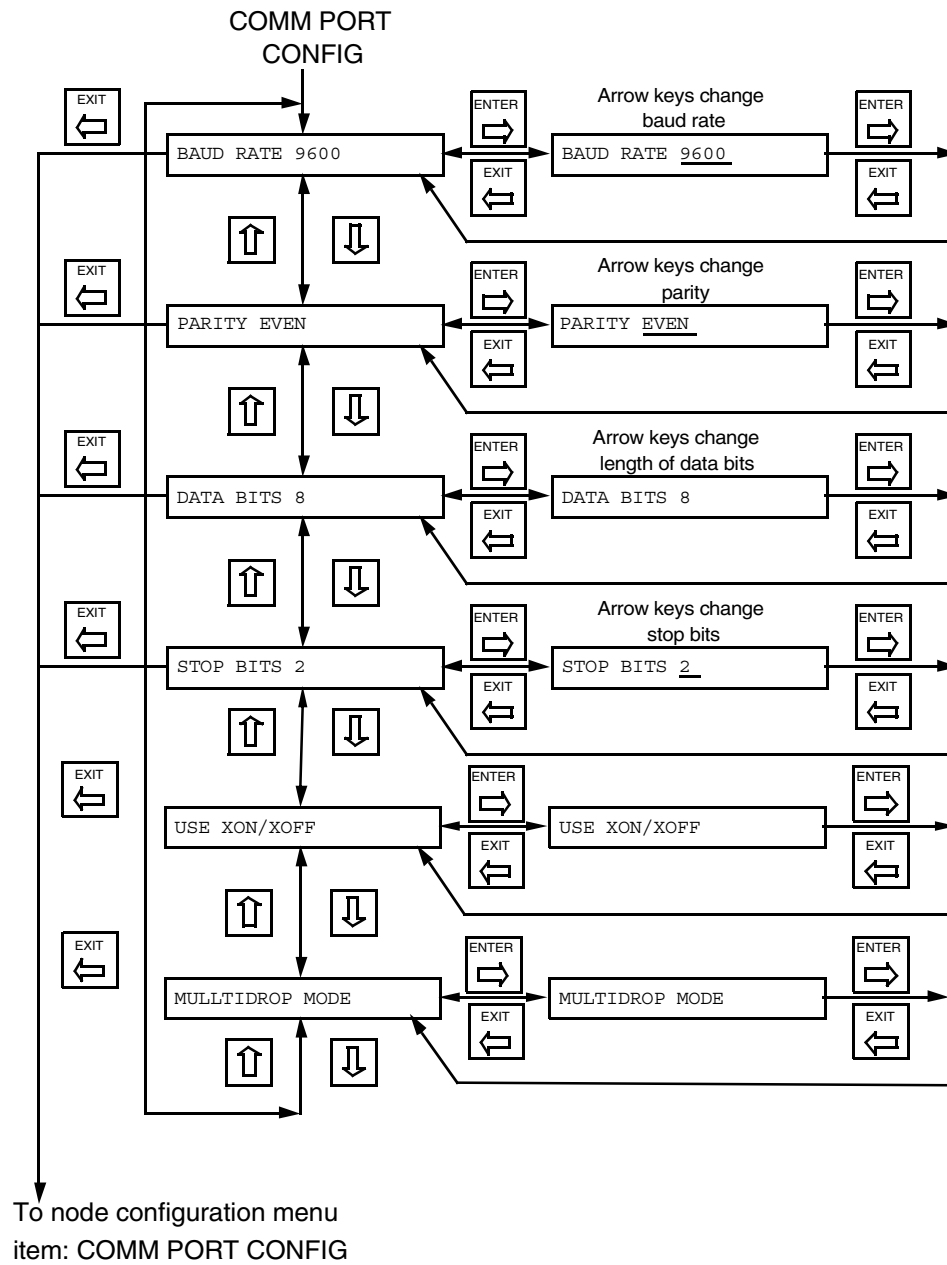
The NODE CONFIGURATION MENU is used to configure various parameters of the DL3800E, including the following.

Table 5-5 NODE CONFIGURATION MENU Items

Parameter	Definition
Unit ID	<p>The Unit ID is an alphanumeric designation up to 16 characters in length. The unit is shipped without a Unit ID.</p> <p>To access Unit ID from the NODE CONFIGURATION MENU, press Enter when Unit ID appears. Press Enter again and the first space or letter blinks. Use the arrows to select the desired letter or number. Press Enter again to confirm the selection, and move to the next letter or number</p>
Unit Number	<p>The Unit Number is a four digit number. The unit is shipped from the factory without a number.</p> <p>Note: Each unit must be set to a different number to allow remote communication and daisy chaining of multiple units. For example, if the remote unit is set to the same number as the local unit you will not be able to access the remote unit.</p> <p>To access the Unit Number, press Enter when Unit Number appears in the display. To enter or change the Unit Number, follow the same steps as in entering the Unit ID. The following entry should be added:</p>
REM Access ON/OFF	This enables or disables the capability that allows users to view and access the local configuration settings from the remote unit.
Date & Time	<p>The Date & Time are factory set to PST. The format in the display looks like: June 07, 1998 09:44:49</p> <p>To change the Date & Time, follow the procedure described under "Node Configuration."</p>
Node Comm Port	These communications port parameters can be set through this display: Baud Rate, Parity, Data Bits, Stop Bits, Flow Control, Multidrop Mode.
Baud Rate	The BAUD RATE MENU is accessed through the NODE COMM PORT MENU. When the menu is first displayed, it will show the present Baud Rate: 38,400, 19,200, 9600, 4800, 2400, 1200, 600, or 300.
Parity	The PARITY MENU is accessed through the NODE COMM PORT MENU. When the menu is first displayed, it will show the present Parity: either No, Odd, or Even.
Data Bits	The DATA BITS MENU is accessed through the NODE COMM PORT MENU. When the menu is first displayed, it will show the present Data Bits configuration, either 7 or 8.
Stop Bits	The STOP BITS MENU is accessed through the NODE COMM PORT MENU. When the menu is first displayed, it will show the present Stop Bits configuration: either 1, 1.5, or 2.

Table 5-5 NODE CONFIGURATION MENU Items (Continued)

Parameter	Definition
Local Terminal XON/XOFF	With the Flow Control feature On, the terminal can request that the Terminal quit sending data when its buffers are full. The choices are Use or Ignore XON/XOFF
Terminal Multidrop	If the local terminal is connected to more than one DL3800E, it must be in Multidrop Mode. If it is connected to only one unit, this feature can be disabled. When it is disabled, the system comes up directly, without having to log in. The choices are Multidrop Mode and Direct Terminal.

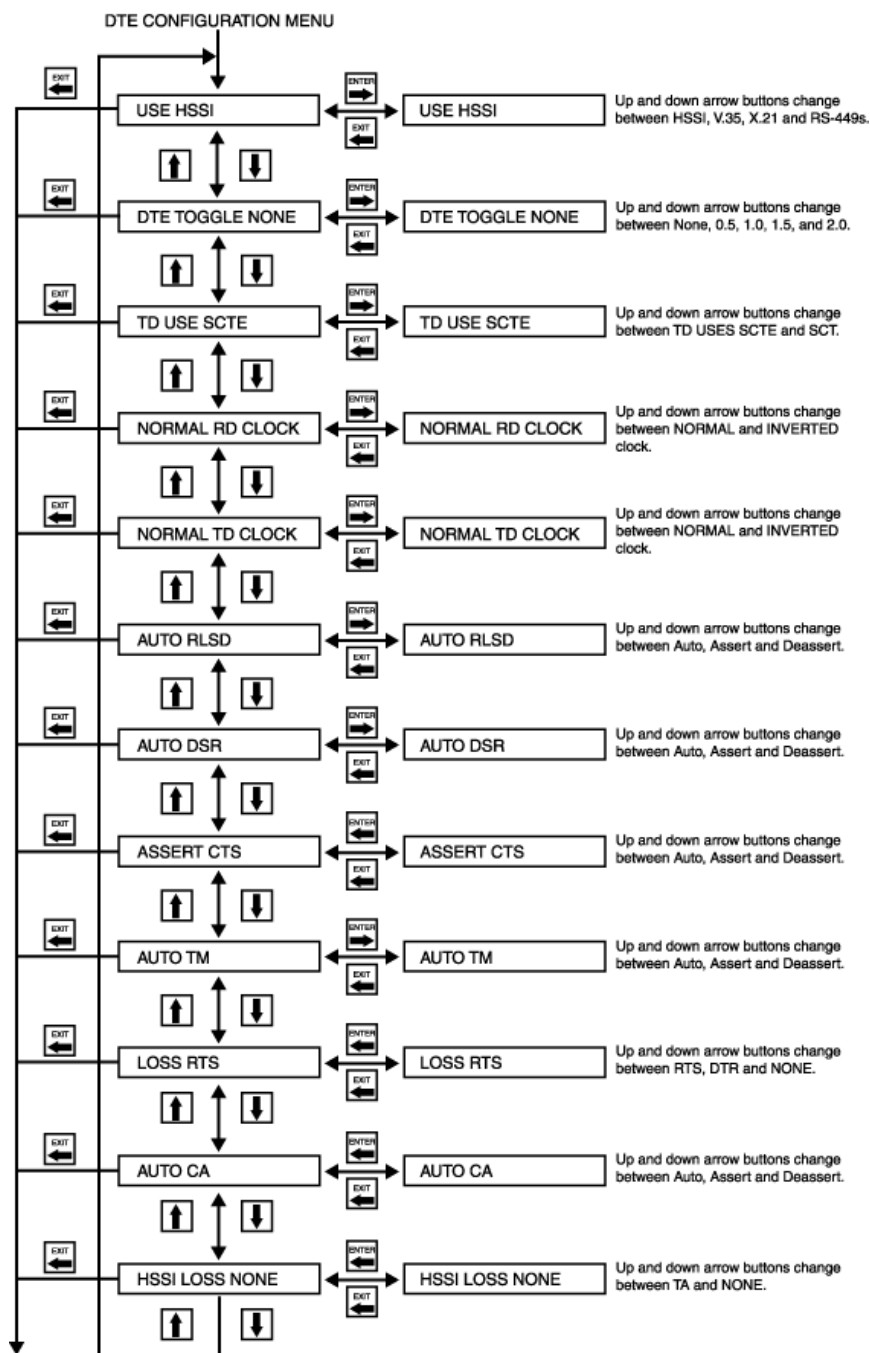


Note that both the NODE HW (HARDWARE) REV and the NODE SW (SOFTWARE) REV are set at the factory and cannot be changed.

DTE Configuration Menu

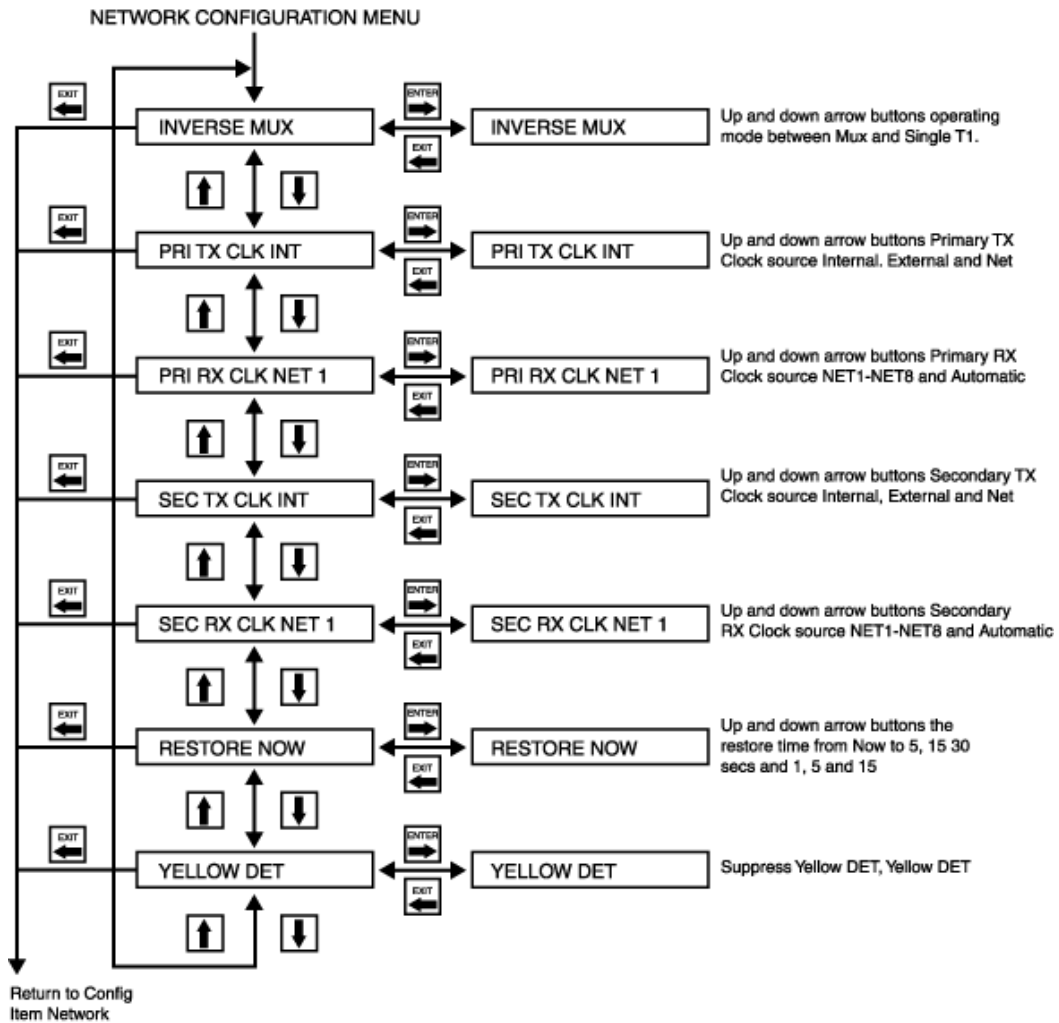
This menu allows you to set various configurable items for the DTE port.

For each item on this menu, pressing the **Enter** button causes the configurable item to start flashing. Pressing the up arrow and DOWN ARROW buttons changes the value of the flashing item. Pressing **Enter** again terminates the configuration of that item. Pressing **Exit** aborts the operation without making the change. Each of the Configurable items are described in detail in [“Network Configuration” on page 4-25](#).



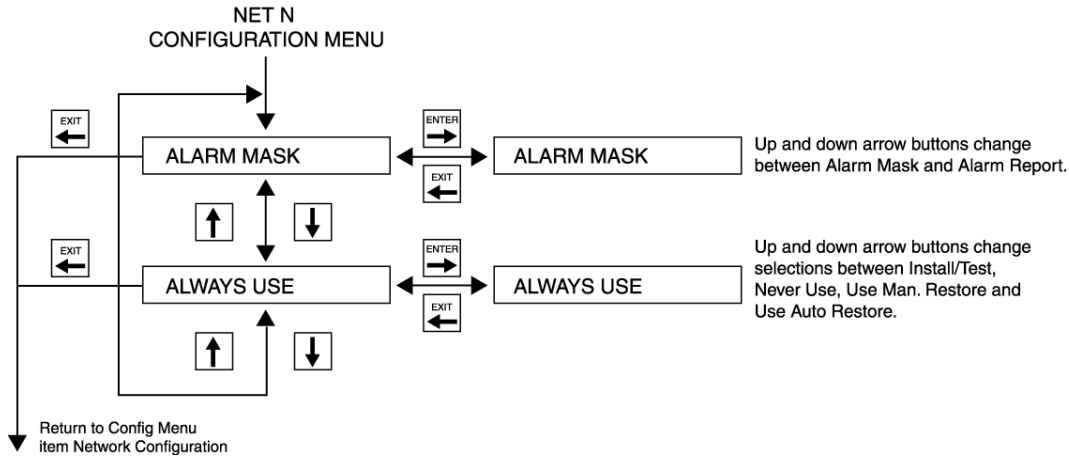
Network Config

The NETWORK CONFIG MENU allows you to change various configurable items common to all E1 network ports. For each item on this menu, pressing **Enter** causes the configurable item to start flashing. Pressing the up arrow and DOWN ARROW buttons changes the value of the flashing item. Pressing **Enter** again terminates the configuration of that item. Pressing **Exit** aborts the operation without making the change. Each of the Configurable items are described, along with the various options, in detail in [“Network Configuration” on page 4-25](#).



NET N Config

The NET N CONFIG MENU allows you to change various configurable items common to all E1 network ports. The menu is shown below.



For each item on this menu, pressing **Enter** causes the configurable item to start flashing. Pressing the up arrow and DOWN ARROW buttons changes the value of the flashing item. Pressing **Enter** again terminates the configuration of that item. Pressing **Exit** aborts the operation without making the change. Each of the Configurable items are described in detail in “[Network Configuration](#)” on page 4-25 of this User Manual.

NETWORK THRESHOLDS

This Menu allows you to enable/disable the automatic FALLBACK feature and set the various Network Alarm Thresholds that will cause the E1 lines to automatically be taken out of service.

Three levels of thresholds can be turned On or Off, and values set through this menu: CON (CONSECUTIVE), 15-minute, and 24-hour. Thresholds can be set for the number of Consecutive seconds (1-100) containing errors, for the number of seconds containing errors in a 15-minute interval (1-900), and for the number of 15-minute intervals containing errors in a 24-hour period (1-96).

You can set the threshold value for Minor (MI) and Major (MJ) alarms, where exceeding the Minor alarm threshold will generate an alarm report and the exceeding a Major alarm threshold will actually cause an E1 line to be automatically taken out of service.

Pressing **Enter** when NET THRESHOLDS appears in the display screen will start the menu and allow you to scroll, using the down or up arrow buttons, through the following options:

Table 5-6 NET THRESHOLD Options and Values

OPTION	VALUE
CON CRCS	010
CON CRCS	OFF
CON SES	010
CONSES	ON
CON UAS	015
CON UAS	OFF
15.MIN.MI.BPV	100
15.MIN.MJ.BPV	100
15.MIN.MJ.BPV	OFF
15.MIN.MI.CRCS	100
15.MIN.MJ.CRCS	100
15.MIN.MJ.CRCS	OFF
15.MIN.MI.ES	100
15.MIN.MJ.ES	100
15.MIN.MJ.ES	OFF
15.MIN.MI.SES	100
15.MIN.MJ.SES	100
15.MIN.MJ.SES	OFF
15.MIN.MI.UAS	100
15.MIN.MJ.UAS	100
15.MIN.MJ.UAS	OFF
24.HR.MI.BPV	10
24.HR.MJ.BPV	10
24.HR.MJ.BPV	OFF
24.HR.MI.CRCS	10
24.HR.MJ.CRCS	10
24.HR.MJ.CRCS	OFF

Table 5-6 NET THRESHOLD Options and Values (Continued)

OPTION	VALUE
24.HR.MI.ES	10
24.HR.MJ.ES	10
24.HR.MJ.ES	OFF
24.HR.MI.SES	10
24.HR.MJ.SES	10
24.HR.MJ.SES	OFF
24.HR.MI.UAS	10
24.HR.MJ.UAS	10
24.HR.MJ.UAS	OFF

To turn a Major Alarm ON or OFF, use the UP and DOWN ARROW buttons to get the specific alarm in the display window and press **Enter**. Using the arrow buttons, select ON or OFF. To change an alarm threshold value, use the UP and DOWN ARROW buttons to get to that particular alarm and press **Enter**. Use the Up or Down buttons to raise or lower the value.

EQUIPMENT RETURN AND REPAIR

If faulty equipment is suspected, perform the tests in this section. If, after performing these tests, the DL3800E unit or any associated module is suspected to be faulty, call Quick Eagle Technical Support at (408) 745-4200.

RUNNING DIAGNOSTIC TESTS

You should test the DL3800E unit before you use it. If it, or an associated module, does not operate properly during or after testing, call Quick Eagle Networks Technical Support at: (408) 745-4200.

This chapter contains procedures for testing the DL3800E unit followed by suggestions for troubleshooting problems.

You use the DTE AND NETWORK TESTS MENU to initiate and terminate one DTE test and three network tests. The four tests are:

- DTE/NETWORK Loopback
- Payload Loopback
- LINE Loopback
- LOCAL Loopback



NOTE: You do not need to inform the telephone company that you're running the tests. However, if the tests reveal a problem with a carrier's service or with the DL3800E, you should inform the carrier that the DTE equipment or the DL3800E unit must be removed from service.

To initiate a loopback test in the DTE AND NETWORK TESTS MENU, select TESTS from the INVERSE MULTIPLEXER MAIN MENU, and press **Enter** to open the menu.

Select a test on a specific network port, set to ON, select CONFIRM, and press **Enter**.

To terminate or cancel the test, select it, set to OFF, select CONFIRM, and press **Enter**.

The example in [Figure 6-1](#) shows the TEST MENU.

```

Major          01/01/90  17:56:47Unit: 1    NET : 2 (33)
                Loss of Frame
Idled          01/01/90  17:56:58Unit: 1    NET : 2 (13)
                Loss of Frame Idled

DIGITAL LINK DL3800E SR 1.XX  NODE  1:HOME  01/01/90  03:14:54  MN
SELECTED DEVICE ADDRESS:  1.00.000NAME:HOME

DTE AND NETWORK TESTS          Exit          Confirm

DTE TESTS:
                DTE/NETWORK LOOPBACK:Off

                NETWORK TESTS:
PORT#  PAYLOAD LOOPBACK  LINE LOOPBACK  LOCAL LOOPBACK
  1          Off          Off          Off
  2          Off          Off          Off
  3          Off          Off          Off
  4          Off          Off          Off
  5          Off          Off          Off
  6          Off          Off          Off
  7          Off          Off          Off
  8          Off          Off          Off
    
```

Figure 6-1 TESTS MENU



NOTE: The following 3 tests interrupt payload traffic to the unit.

DTE/Network Loopback Test

Use the DTE/NETWORK Loopback test to verify the data port and associated cabling. This bi-directional loopback loops the received data port signal back to the data port and the received E1 processor signal back to the E1 network. It can test a problem whose source is the E1 line.

LOCAL Loopback Test

Use the LOCAL Loopback test to verify the operation of the DL3800E unit data port and its connections.

To receive valid test data at the DTE device, run LOCAL Loopback on all active E1 ports.

Payload Loopback and Line Loopback Tests

Use the PAYLOAD Loopback and LINE Loopback tests to verify the proper operation of the DL3800E unit and selected E1 networks.

Both tests loop the payload data received from the E1 network back to the network.

With the PAYLOAD Loopback, the DL3800E unit regenerates the data and inserts a new framing pattern before it loops back the data. This verifies the unit's E1 framing and the E1 network.

With the LINE Loopback, the DL3800E unit does not do any additional processing of the data before it regenerates it and loops it back. This minimizes the involvement of the DL3800E unit during this test so that problems can be isolated to the network.

PAYLOAD and LINE Loopbacks remove the port from the DTE *data bundle* unless the port is configured to "Install/Test Only" mode.

Possible Sources of Problems

The PAYLOAD Loopback can test a problem whose source may be the DL3800E.

The LINE Loopback can test a problem whose source may be the Telco E1 line, wiring between the Telco demarcation points, the DL3800E unit at one or both ends, or the cable between the E1 line reporting errors and the DL3800E.

The TEST LED on the DL3800E unit turns red during the tests, and the E1 port LED turns yellow.

TROUBLESHOOTING THE DL3800E

This section describes problems you may encounter on the DL3800E unit and suggests ways you can troubleshoot them.

The troubleshooting procedure is designed to isolate the faulty or malfunctioning item to the E1 network, the DTE equipment, the cable from the DTE to the DL3800E unit or the DL3800E unit itself. The built-in diagnostic features of the DL3800E unit aid you in quickly identifying and isolating faults.

Using the front panel buttons and display, the ASCII terminal or SNMP workstation, you can run a series of loopback tests. Verification of the proper functioning of the DTE equipment and the DL3800E unit is

accomplished through DTE loopback and a self test. Testing for the proper functioning of the remote DL3800E unit is accomplished by a Line loopback.

It is also possible to verify the path from the DTE through the E1 line to the remote-end DL3800E, provided the DTE equipment can generate and detect looped back bit streams.

These suggestions can help determine which portion of the network might be at fault. When discovering a failure, check the simple solutions first. Is the power turned on? Is the equipment set up and configured properly? Will swapping cable pairs solve the problem?

The DL3800E unit is equipped with alarms that alert you to the existence of possible problems with the unit, and received signals from the DTE or network. LEDs on the Module provide a quick indication of the status of that module: green light indicates everything is functioning normally.

Table 6-1 Troubleshooting (1 of 5)

Problem	Solution
DL3800E unit doesn't power up.	<p>If the DL3800E unit is AC powered, make sure it is plugged into a live AC outlet. If it is DC powered, make sure the respective DC leads are not crossed.</p> <p>Check all fuses for opens, replace as needed. If the DL3800E unit blows fuses continuously, call Quick Eagle Networks Technical Support.</p>
You cannot communicate with the remote DL3800E.	<p>Make sure both units are in Inverse Mux mode, not Single E1 DSU.</p> <p>Verify that the local and remote units have unique ID's.</p> <p>If a DTE device is not connected at either end, set DTE LOSS to None.</p> <p>Make sure your E1 port LED's are solid green, indicating that the circuits are up and running.</p>
The TEST LED on the DL3800E unit is constantly on.	<p>Make sure no tests are being initiated, and check the TEST display from a terminal.</p> <p>If a test is running, end it by selecting the test and set it to Off in the DTE and NETWORK TESTS MENU.</p> <p>Make sure the DTE device or the E1 carrier is not sending loop up and loop down codes.</p>

Table 6-1 Troubleshooting (2 of 5)

Problem	Solution
The NETWORK E1 port LED's on the DL3800E unit never illuminate.	<p>Make sure the E1 cable from your service provider is connected to the DL3800E.</p> <p>Make sure that the E1 port is set to configuration other than "NEVER USE".</p> <p>Remove the E1 cable from the affected E1 port, and hardloop the interface by connecting pins 1-3 and 9-11 of the DB-15 port. If the E1 LED lights up, check your E1 cabling, and contact your service provider.</p>
The NETWORK E1 LEDs on the DL3800E unit are constantly red.	<p>Check each E1 port configuration to make sure the framing and line code are what the carrier is providing.</p> <p>Check each DL3800E unit for excessive errors.</p> <p>Check the E1 cabling or inside wiring for possible problems.</p> <p>Verify with the service provider that the local Smart Jack is not looped up.</p> <p>Perform the hardloop procedure on the affected E1 port to verify that the E1 port is functioning on the unit.</p>
The NETWORK E1 LEDs are constantly yellow.	<p>Make sure no tests are being initiated on the affected E1 ports.</p> <p>Individual E1 port tests cause the E1 LED to turn yellow.</p> <p>If a test is running, end it by selecting the test, and setting it to Off in the DTE and NETWORK TESTS MENU.</p> <p>Verify that the DTE device, the E1 carrier, or the remote unit is not sending loopup and loopdown codes (check the Alarm & Status Menu).</p>
The NETWORK E1 LEDs are flashing yellow.	<p>Check the CURRENT ALARMS AND STATUS ITEMS MENU to see if the unit is receiving an E1 yellow alarm or an Alarm Indication Signal (AIS).</p> <p>Make sure the remote unit is receiving a valid E1. If it is not, it will transmit a yellow alarm.</p>

Table 6-1 Troubleshooting (3 of 5)

Problem	Solution
<p>The NETWORK E1 LEDs on an DL3800E unit are flashing green.</p>	<p>Make sure a valid DTE device is connected to the DL3800E, and is powered on.</p> <p>If no DTE device is connected and the unit is configured for V.35 or RS449, make sure that DTE LOSS is set to None. If the unit is configured for HSSI, check for a valid HSSI signal (TA).</p> <p>If a DTE device is connected, make sure all DTE port LEDs are on.</p> <p>Check the CURRENT ALARMS AND STATUS ITEMS MENU to make sure no alarm thresholds have been exceeded.</p> <p>An E1 circuit is taken out of service for a configured amount of time if Fallbacks (in Network Alarm Thresholds) or Second Error Restoral Interval (in Network Configuration) is enabled, and a threshold has been exceeded.</p> <p>Make sure that the correct E1 cable is connected to the correct E1 port.</p> <p>Make sure that the E1 lines are not crossed (Check Alarms & Status Menu). You must restore the E1 line manually if it is configured for use w/Manual Restore (in Network Configuration), and a threshold or alarm condition has been exceeded.</p>
<p>The DTE port LED's on the DL3800E unit do not illuminate.</p>	<p>Make sure the correct DTE cable is securely attached to both units, and the connected DTE device is actually passing traffic.</p> <p>If the connected DTE device does not support the RTS or DTR leads, configure the DTE LOSS for None. This asserts the CTS lead from the DL3800E.</p> <p>Make sure the DL3800E unit is configured for the correct electrical signaling from the DTE device: V.35, RS449, HSSI or x.21.</p>
<p>The UNIT Major and Minor Alarm LEDs on the DL3800E unit do not clear.</p>	<p>Alarm thresholds may have been exceeded for the 15 minute or 24 hour periods. If other thresholds have not been exceeded, the DL3800E unit automatically clears these alarms after the period has passed.</p>

Table 6-1 Troubleshooting (4 of 5)

Problem	Solution
The connected DTE device shows intermittent errors.	<p>Run a DTE/NET Loopback to verify the physical connection between the local DTE device and the DL3800E.</p> <p>If errors are reported during this loopback, check the DTE cable.</p> <p>Make sure the DTE device supports the DTE port clocking option.</p> <p>Use SCTE clocking for the DTE device if the application is using V.35, and the DL3800E unit has more than two connected E1 circuits.</p> <p>Try inverting DTE Tx clock and/or Rx clock when in v.35/RS-449 or x.21 modes.</p> <p>Make sure the DTE device can handle the set DTE clocking speed.</p>
The DTE/NETWORK Loopback does not work towards the locally connected DTE device.	<p>Make sure the DTE device can run to a DCE in loopback.</p> <p>If configured for SCTE, the DTE device must be able to support SCTE clock. If it does not, set the clocking to SCT.</p> <p>Make sure that the Transmit or Receive clock is inverted.</p> <p>Make sure the DTE device does not need to see RLSD (RECEIVE LINE SIGNAL DETECTED) during this loopback. If it does, set RLSD in the DTE CONFIGURATION MENU to ASSERT this lead.</p>
The DL3800E unit has timing and synchronization problems.	<p>Make sure the timing source is set properly.</p> <p>If the clock source is provided by the circuit provider, set XMT PRIMARY CLOCK SOURCE to Net, and RCV to the E1 network providing the clocking.</p> <p>If the clocking is expected from a specific E1 circuit but the circuit is not in service, set RCV PRIMARY CLOCK SOURCE to AUTO.</p> <p>If the clock source is not provided by the circuit provider, set XMT PRIMARY CLOCK SOURCE to INT and the remote unit XMT PRIMARY CLOCK SOURCE to NET, and RCV to AUTO.</p> <p>Make sure the proper E1 cables are plugged into the corresponding ports on the DL3800E.</p>

Table 6-1 Troubleshooting (5 of 5)

Problem	Solution
You cannot access the DL3800E unit from a terminal.	<p>The terminal must be running a VT100 or compatible terminal emulation program.</p> <p>Make sure you are using a straight through cable with pin 8 CTS cut at the terminal end.</p> <p>Make sure the Comm Port parameters match the terminal's, and the DL3800E unit has a unique ID. If the DL3800E unit is in a daisy-chain, you can display a roll call of all unit numbers by pressing <code>Ctrl-x</code> five times.</p>



Specifications

E1 NETWORK INTERFACE

Parameter	Setting
Interface Type	E1
Number of Ports	2, 4, 6 or 8
Framing Formats	CRC4 (Enabled or Disabled)
Line Code	HDB3
Transmit Line Rate	2.048 Mbps \pm 50 ppm
Receive Line Rate	2.048 Mbps \pm 75 ppm
Synchronization	Internal, Loop-timed, or External
Network Connector	DA-15 Socket or BNC connectors

EXTERNAL CLOCK INTERFACE

Parameter	Setting
Rate	2.048 MHz \pm 50 ppm
Connector Type	DE-9
Input Impedance	10 k Ω
Input Voltage	\pm 7 V per RS-422 Standard (Balance)



DTE INTERFACE

Item	Interface
Electrical Interface	HSSI or V.35/RS-449/X.21
Rate	Up to 15.808 Mbps
Connector Types	DB-25 Socket (V.35/RS449/X.21) 50-pin Socket Amplitite (HSSI)
Number of Ports	One

COMM PORT

Item	Interface
Interface Devices	Terminal or Modem
Protocol	ASCII (VT100)
Electrical	RS-232 Socket (DE-9)

NMS PORT (SNMP)

Item	Interface
Interface Devices	SNMP Manager
Protocol	SNMP (UDP/IP) over SLIP
Electrical	RS-232 (DE-9)

FRONT PANEL

Item	Interface
Display	16 Character Alphanumeric
Key Pad	Four Keys
DTE Status LEDs	TD, RD, RTS (TA), CTS (CA), HSSI, TEST, T1-T8
TEST Status LEDs	TEST
Unit Status LEDs	Status MAJ MIN

DIAGNOSTICS

Item	Interface
Loopbacks	DTE/Network, Payload, Line, Local
Self Test	Checks Unit Circuitry and Memory on power up
Alarms	Relay, dry contact
Lamp Test	Press Exit and Enter key at the same time.

POWER

Power	Setting
AC Input	90 VAC, 0.5 A Max 264 VAC, 0.25 A Max
DC Input (Optional)	-40 VDC to -75 VDC
Power Consumption	40 W Maximum

ENVIRONMENTAL

Item	Temperature
Operating Temperature	0°C to 50°C



Item	Temperature
Storage Temperature	-20°C to 60°C
Relative Humidity	0 to 95% Noncondensing
Altitude	-200 ft to 10000 ft (-60.1 m to 3.048 km) above sea level
MTBF	8 years.

PHYSICAL /CONNECTORS

Item	Dimensions
Mounting	19-inch or 23-inch rack mounting or Standalone
Dimensions	17.2 in W x 2.8 in H x 11 in D (43.7 cm W x 7.1 cm H x 27.9 cm D)

EXTERNAL ALARM CONTACTS

DB-9	Alarm Designations	Signal
1	Alarm In (+)	Input
3	Alarm In (-)	Input
4	Major NO	Normally Open Output
5	Major Common	Common
9	Major NC	Normally Closed Output
2	Minor NO	Normally Open Output
7	Minor Common	Common
6	Minor NC	Normally Closed Output
8	Not Connected	

The External alarms are used to turn on a Bell or Light to indicate that an alarm has occurred on the DL3800E. Either the Major, Minor, or both can be wired to the DB-9 Connector on the back.

Normally Open (Major or Minor) – The Alarm is off when there is an open on the alarm circuit. Will indicate an alarm when the circuit is closed.

Normally Closed (Major or Minor) – The alarm is off when there is a short on the alarm circuit. Will indicate an alarm when the circuit is open.

Alarm In – This alarm can be used to indicate to the DL3800E unit that an external alarm has occurred such as a door opening or closing. This would require the customer to use a 48V volt supply to drive the alarm.



Pinouts

TERMINAL CONNECTION

Table B-1 COMM and NMS Port Pin Assignments

SIGNAL	DIRECTION	PIN
Receive Data	To Terminal	2 RD
Send Data	From Terminal	3 SD
Clear to Send	To Terminal (Connect between units, but not to the Terminal)	8 CTS
Signal Ground	(Bidirectional)	5 SG

DCE CONNECTORS

Table B-2 HSSI DCE Connector Pin Assignments

SIGNAL	DIRECTION	PIN # +SIDE	PIN # - SIDE
SG - Signal Ground	—	1	26
RT - Receive Timing	To DTE	2	27
CA - DCE Available	To DTE	3	28
RD - Receive Data-	To DTE	4	29
Reserved future	To DTE	5	30
ST - Send Timing	To DTE	6	31
SG - Signal Ground	—	7	32
TA-DTE Available	From DTE	8	33
TT - Terminal Timing	From DTE	9	34
LA - Rollback Circuit A	From DTE	10	35
SD - Send Data	From DTE	11	36
LB - Rollback Circuit B	From DTE	12	37
SG - Signal Ground	—	13	38
5 ancillary to DCE	From DTE	14-18	39-43



Table B-2 HSSI DCE Connector Pin Assignments (Continued)

SIGNAL	DIRECTION	PIN # +SIDE	PIN # - SIDE
SG- Signal Ground 5 ancillary from DCE	—	19	44
5 ancillary from DCE	To DTE	20-24	33-49
SG - Signal Ground	—	25	50

CHANNEL 1 DATA CABLE PIN ASSIGNMENTS

The pin assignments for the V.35, M-34 to DB-25 DTE cable are listed in Table B-3.

Table B-3 V.35, M-34 to DB-25 DTE Cable Pin Assignments

M-34	DB-25	Signal Name	Signal
T	16	RD B	To DTE
R	3	RD A	To DTE
S	14	SD B	From DTE
P	2	SD A	From DTE
E	6	DSR	To DTE
H	20	DTR	From DTE
K	25	TM	DTE
B	7	Signal Ground	NA
D	5	CTS	To DTE
F	8	RLSD	To DTE
V	17	SCR A	To DTE
X	9	SCR B	To DTE
Y	15	SCT A	To DTE
AA	12	SCT B	To DTE
U	24	SCTE A	From DTE
W	11	SCTE B	From DTE
C	4	RTS	From DTE
A	NC	Frame Ground	NA

Table B-4 EIA-530, DB-25 to DB-25 DCE Connector Pin Assignments

DB-25	DB-25	SIGNAL
17 35	24 11	SCTE
7 25	4 19	RTS
24 6	16 3	RD
22 4	14 2	TD
11 18	6 25	DSR
27 8	13 5	CTS
13 31	8 10	RLSD
26 8	9 17	SCR
5 23	15 12	SCT
19 NC	7 NC	SG
1	NC	FG

DB-25 to DC-37 Data Port Cable Pin Assignments

The pin assignments for the DB-25 to DC-37 Data Port cable are listed in Table B-5.

Table B-5 DB-25 to DC-37 Data Port Cable Pin Assignments

DC-37	DB-25	Signal Name	Signal
17	24	TT A	From DTE
35	11	TT B	From DTE
7	4	RS A	From DTE
25	19	RS B	From DTE
6	3	RD A	To DTE
24	16	RD B	To DTE
4	2	SD A	From DTE
22	14	SD B	From DTE
11	6	DM A	To DTE
29	22	DM B	To DTE
9	5	CS A	To DTE
27	13	CS B	To DTE
12	20	TR A	To DCE
30	23	TR B	To DCE
13	8	RR A	To DTE
31	10	RR B	To DTE
8	17	RT A	To DTE
26	9	RT B	To DTE
5	15	SCT A	To DTE
23	12	SCT B	To DTE
19	7	Signal Ground	NA
1	NC	Frame Ground	From DTE
18	25	TM	To DTE

COMMUNICATION PORT PIN ASSIGNMENTS

RS-449, DC-37 to DB-25 DCE Cable Pin Assignments

Table B-6 describes the RS-449, DC-37 to DB-25 DCE cable pin assignments.

Table B-6 RS-449, DC-37 to DB-25 DCE Cable Pin Assignments

DC-37	DB-25
8	24
26	11
13	4
31	19
22	16
4	3
24	14
6	2
12	6
30	22
29	23
11	20
25	10
7	8
35	9
17	17
19	7
NC	1

E1 NETWORK PIN ASSIGNMENTS

The network connector is a DA-15 connector. The assignments for the Network connector are given below.

Table B-7 Network Pin Assignments

PIN	SIGNAL
1	Send towards Network Tip (T1)
9	Send towards Network Ring (R1)
2	Frame Ground
3	Receive from Network Tip (T)
11	Receive from Network Ring (R)
4	Frame Ground
5,6,7,8,10,12,13,14,15	Not Connected

DB-25 TO DE-9 ADAPTER PINOUTS

An adapter is available from Quick Eagle Networks that will allow the Quick Eagle Networks DE-9 ribbon cable to be compatible with a DB-25 connector on the terminal port.

Table B-8 DB-25 to DE-9 Pinouts

DB-25	DE-9
2	3
3	2
4	7
5	8
6	6
7	5
8	1
23	9
21	4

X.21 TO DB-25 CABLE PINOUTS

Table B-9 DB-25 to DB-15 Pinouts

X.21	Signal Name	DB-25
3	Control (A)	4
10	Control (B)	19
4	Rx DAta (A)	3
11	Rx Data (B)	16
2	Send Data (A)	2
9	Send Data (B)	14
5	Indication (A)	8
12	Indication (B)	10
6	Serial Clock Rx (A)	17
13	Serial Clock Rx (B)	9
*7	Serial Clock External (A)	24
*14	Serial Clock External (B)	11
8	Signal Ground	7

* Needs to be wired in when using X.21 with SCTE.

EXTERNAL CLOCK CONNECTOR PIN ASSIGNMENTS

A DE-9 connector is provided on the DL3800E unit rear panel for connection to an External Clock. Pin Assignments for the External Clock connector are as Listed in Table B-14:

Table B-10 External Clock Pinouts

PIN	SIGNAL
1	Signal A
2	Signal B
5	Shield
3,4,6,7,8,9	No Connection

B

Per RS-422 requirements, the receiver has an input sensitivity of 200 mV over the input voltage range of ± 7 V. The frequency is 2.048 MHz \pm 50 ppm, and the impedance is 10 k Ω .

ALARM PINOUT

Pin Assignments for the Alarm connector are as follows:

Table B-11 Alarm Pinout

PIN	SIGNAL
5	Maj Comm
9	Maj NC
4	Maj NO
8	not connected
3	Alarm in -
7	Min Comm
2	Min NO
6	Min NC
1	Alarm in +

Maj	-	Major
Min	-	Minor
NC	-	Normally Closed (unless alarm condition is true this pin is connected to the appropriate comm pin)
NO	-	Normally Open (only during an alarm condition will this be connected to the appropriate comm pin)
Alarm in	-	input for an alarm to the device

The above table shows the signal names and pin connections. These outputs of Major alarms normally open and normally closed, Minor alarms normally open normally closed, and Alarm in + & - are done through relays and an optoisolators respectively. They are designed for -48v, although a lower voltage should work equally well.

DC POWER CONNECTIONS

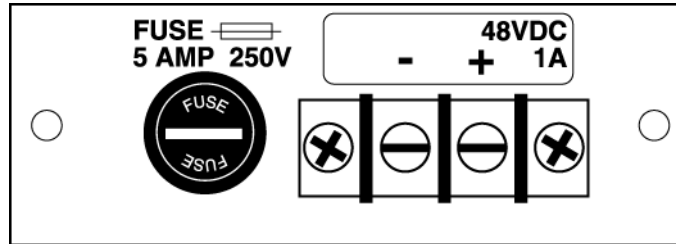


Figure B-1 DC Power Connections

DTE CLOCK RATES

Table B-12 DTE Clock Rates

	NETWORKS	DTE CLOCK RATE, MBPS
TSLOT16= DATA	1	1.976
	2	3.952
	3	5.928
	4	7.904
	5	9.880
	6	11.856
	7	13.832
	8	15.808
TSLOT=FLAG	1	1.912
	2	3.824
	3	5.736
	4	7.648
	5	9.560
	6	11.472
	7	13.384
	8	15.296



Factory Default Settings

Table C-1 Unit Settings

Unit	Setting
ALARM ENABLE	Disabled
AUTOMATIC BACKUP	5 minutes after each database change
FRONT PANEL	On
UNIT NUMBER	0
TERMINAL BAUD RATE	9600
TERMINAL PARITY & BITS	8 bits, No parity
TERMINAL STOP BITS	2
XON/XOFF	Enabled
MULTIDROP	Enabled

Table C-2 DTE Settings

DTE	Setting
DTE INTERFACE	V.35
CLOCK	SCTE
TX CLOCK	Normal
RX DLOCK	Normal
RLSD MODE	Automatic
DSR MODE	Automatic
CTS MODE	Automatic
TM MODE	Automatic
DTE LOSS DETECTION	RTS

Table C-3 Network Settings

Network	Setting
ALARM	Mask
ACTIVE/RESTORE MODE	Never Use
FRAME	CRC4
LINECODE	HDB3
TSLOT 16	DATA
NATIONAL BIT	1-5
PRIMARY CLOCK SOURCE	Xmt Int. Rcv Net 1
SECONDARY CLOCK SOURCE	Xmt Int. Rcv Net 2
DSU MODE	Inverse Mux (Standard Operation)
SUPPRESS YELLOW DET	Disabled

Table C-4 Network Threshold Settings

Network Threshold	Setting
CONSECUTIVE THRESHOLDS	Fallback Disabled, Seconds 10
INTERVAL THRESHOLDS (15 MIN)	Fallback Disabled
Seconds	Major 100 Minor 100
INTERVAL THRESHOLDS (24 HR)	Fallback Disabled
Seconds	Major 10 Minor 10

Table C-5 SNMP Configuration Settings

SNMP Configuration	Setting
ALL ADDRESSES	0.000.000.000
READ COMMUNITY STRING	Public
WRITE COMMUNITY STRING	Public
TRAP COMMUNITY STRING	Public
SNMP BAUD RATE	9600

Table C-5 SNMP Configuration Settings

SNMP Configuration	Setting
BITS & PARITY	8 bits, No parity
STOP BITS	2

Table C-6 Test Settings

Tests	Setting
ALL LOOPBACKS & TESTS	Off



Glossary

A

ABAM

A designation for 22-gauge, 110-ohm, plastic-insulated, twisted-pair Western Electric cable normally used in central offices.

AIS (Alarm Indication Signal)

An unframed sequence of All Ones normally sent by a DSU/CSU that cannot maintain the required pulse density in AMI mode or sent by a CSU that has a loss of signal condition on its data port. The signal is sent to maintain continuity of transmission and to notify the far-end that a transmission fault exists on the line. Same as Blue Alarm.

alternate loop code

Used to invert loop codes from U.S. standard code; inverts zeros to ones and ones to zeros.

AMI (Alternate Mark Inversion)

A line code in which the signal carrying the binary value alternates between positive and negative polarities.

ANSI (American National Standards Institute)

Coordinates the development of U.S. voluntary national standards in both the private and public sectors. Standards pertain to programming languages, EDI, telecommunications and physical properties of diskettes, cartridges and magnetic tapes.

ASCII (American National Standard Code)

The standard and predominant seven-bit (eight bits with parity) character code used for data communications and data processing.

asynchronous transmission

Transmission not related to a specific frequency, or to the timing of the transmission facility.

attenuation

Reduction or loss of signal strength, measured in decibels; opposite of gain.

B

B8ZS (Bipolar 8 Zero Substitution)

A technique used to accommodate the ones density requirements of T1 transmission.

bandwidth

The data-carrying capacity of a transmission medium, usually measured in Hertz (Hz), which equals cycles per second.

baud

A measurement of the signaling speed of a data transmission device.

BER

See bit error rate.

BES (Bursty Errored Seconds)

Occurs when a second has 320 or more CRC violations. (ESF format only)

bipolar

The predominant signaling method used for digital transmission services, such as DDS and T1, in which the signal carrying the binary value successively alternates between positive and negative polarities. Zero and one values are represented by the signal amplitude at either polarity, while no value “spaces” are at zero amplitude.

bit error

Occurs when the value of an encoded bit is changed in transmission, and interpreted incorrectly by the receiver.

Bit Error Rate (BER)

The percentage of received bits that are in error, relative to a specific amount of bits received; usually expressed as a number referenced to a power of 10.

bps

Bits per second; the basic unit of measure for serial data transmission capacity; Kbits (kilobits) for thousands of bits per second; Mbitps (megabits) for millions of bits per second, and Gbits (gigabits) for billions of bits per second.

Blue Alarm

An unframed sequence of All Ones normally sent by a DSU/CSU that cannot maintain the required pulse density in AMI mode or sent by a CSU that has a loss of signal condition on its data port. The signal is sent to maintain continuity of transmission and to notify the far-end that a transmission fault exists on the line. Same as Alarm Indication Signal (AIS).

broadband

Services or interfaces that operate above the T1 data rate, typically at NxT1, T3, SONET, or ATM speeds.

BPV (Bipolar Violation)

Occurs when the ones bit is not represented with the opposite signal of the previous ones bit.

C**CCITT**

International Telegraph and Telephone Consultative Committee.

central office (CO)

The phone company switching facility or center; usually a Class 5 end office, at which subscribers' local loops terminate.

channel

A physical or logical path allowing the transmission of information; the path connecting a data source and receiver.

circuit

Generally referring to a transmission medium connecting two or more electronic devices.

clear channel

A characteristic of a transmission path or digital circuit in which the full bandwidth is available to you. The phone company does not use any portion of the bandwidth for framing or control bits.

clock

An oscillator-generated signal providing a timing reference for a transmission link; used to control timing functions such as sampling interval, signaling rate and duration of signal elements.

code conversion

The process of changing the bit grouping for a character in one code into the corresponding bit grouping for the character in another.

CMI (Control Mode Idle)

The process of changing the grouping for a character in one code into the corresponding bit grouping for the character in another.

communications port (Comm Port)

The electrical interface between a unit and the operator's terminal. Operator commands and responses can be communicated through the Comm Port.



connector

A physical interface, such as DB-15 or RS-232-C, typically with male or female components.

CPE (Customer Premises Equipment)

Equipment that interfaces the telephone network and physically resides at your location.

CRC (Cyclic Redundancy Check)

An error checking scheme used to check the received data. The CRC bits within the framing are calculated using the contents of the frame. The calculation is performed again when the frame is received and the CRC values are compared. If they do not match, the frame is considered bad and the CRC statistic is incremental. Performance checking is done by both the carrier and the customer without causing any interference with the T-1 traffic.

CSU (Channel Service Unit)

The CPE used to terminate a digital circuit at the customer site. The CSU performs certain line-conditioning functions, ensures network compliance to FCC rules and responds to loopback commands. It ensures proper ones density in the bit stream and performs bipolar violation correction. The DSU and CSU are often in the same unit.

CTS (Clear to Send)

A signal issued by the DSU to indicate it is connected to the digital network and is ready to accept data.

CV (Code Violation)

Any code violation.

D**D4**

Framing format for T1 transmission that places 12 T1 frames into a superframe. In ESF (a newer framing format) frames consist of 24 bits instead of the previous standard 12 bits as in D4 format.

DACS (Digital Access Cross-Connect Switch)

A digital switching device for routing and switching T1 lines and DS-0 portions of lines among multiple T1 ports. DACS performs all the functions of a normal switch, except that connections are typically set up in advance of a call, not together with a call, as in most, normal low-bandwidth communications systems (e.g. voice-band voice and data). A DACS is in essence a manual T-1 switch.

data link

Any serial data communication transmission path, generally between two adjacent nodes or devices and without any intermediate switching nodes.

data link layer

In the OSI model, the network processing entity that establishes, maintains and releases data link connections between adjacent elements in the network.

DCE (Data Circuit-Terminating Equipment)

Equipment that is either a part of the network, an access point to the network, a network node, or equipment at which a network circuit terminates.

dial-up

Describing the process of, or the equipment or facilities involved in, establishing a temporary connection via the switched telephone network.

digital loopback

A technique for testing the digital processing circuitry of a communications device; may be initiated locally or remotely via a telecommunications circuit. The device being tested returns a received test message, the results of which are compared to the original message.

DS-0 (Digital Signal Level 0)

A 64kbit/s standard digital telecommunications signal or channel.

DS-1 (Digital Signal Level 1)

The 1.544Mbit/s digital signal carried on a T1 facility.

DS-3 (Digital Signal Level 3)

The 44.736Mbit/s digital signal carried on a T3 facility.

DSU/CSU (Data Service Unit/Channel Service Units)

The pair of communications devices that connect an in-house line to an external digital circuit. At the customer's end of the telephone connection, the DSU/CSU takes data from terminals and computers, encodes it, and transmits it down the link. At the receive end, another DSU/CSU equalizes the received signal, filters it, and decodes it for interpretation by the end-user.

DSU (Data Service Unit)

A device designed to connect a DTE to a digital phone line. The DSU transmits and receives the signal and provides buffering and flow control. The DSU and CSU are often in the same unit. Also called a Digital Service Unit.

DSR (Data Set Ready)

A data port signal.



DSU Loopback

A DSU loopback is intended to include as much of the customer data communications circuitry in the looped-back path as possible. The signal passes from the remote unit into the local unit as far as the DSU. This test loops the received network signal back to the network.

DSU/CSU (Data Service Unit/Channel Service Units)

The pair of communications devices that connect an in-house line to an external digital circuit. At the customer's end of the telephone connection, the DSU/CSU takes data from terminals and computers, encodes it, and transmits it down the link. At the receive end, another DSU/CSU equalizes the received signal, filters it, and decodes it for interpretation by the end-user.

DSX-1 (Digital Signal Cross Connect Level 1)

Parameters set used when DS-1 signals are cross connected.

DTE (Data Terminal Equipment)

Terminal equipment connected to the DSU and used for communication over digital networks. May be a terminal, computer, printer or multiplexer.

DTE loopback

An EIA-232-D signal which indicates that the DTE is ready for operation.

DTR (Data Terminal Ready)

Signal from DTE to DSU/CSU.

E

EER (Excessive Error Rate)

Determined by counting the number of T1/T3 code violations during a time interval.

EFS (Error Free Seconds)

Occurs when a second is free of CRC-6 violations or Out of Frame (OOF) events or one or more BPV or OOF events.

EIA (Electronic Industries Association)

An organization which sets data communication industry standards.

encoding/decoding

The process of reformatting information into a format suitable for transmission, and then recovering it after transmission.

equalization

The spacing and operation of amplifiers so that the gain provided by the amplifier, per transmission frequency, coincides with the signal loss at the same frequency; circuitry that compensates for the differences in attenuation at different frequencies.

ES (Errored Second)

Occurs when a second has one or more OOF events or CRC violations or with one or more BPV or OOF events.

ESF (Extended Superframe Format)

A new T1 framing standard used in Wide Area Networks (WANs). With this format 24 frames, instead of 12 are grouped together. ESF provides frame synchronization, cyclic redundancy checking and data link bits in overhead. It allows more information to be stored and retrieved easily, facilitating network performance monitoring and maintenance.

F**failed signal state**

Occurs when ten consecutive severely errored seconds are detected.

far end

The unit or units remote from you.

FE (Framing Errors)

Occurs when the end of a frame is not detected where it should be.

FDL (Facility Data Link)

A four Kbps data channel provided by 12 of the 24 ESF framing bits. It is used by the carrier to request reports, clear error counters and activate loop backs.

FG (Frame Ground)

A signal from DTE to DSU/CSU.

fractional bandwidth DTE loopback

A loopback test that loops back the signal at the network interface. See also loopback.

Fractional T1

A service that provides less than full T1 capacity (one or more 64 Kbps channels are provided).

frame

A group of bits sent serially over a communications channel. The basic data transmission unit employed with bit oriented protocols.

frame relay

A high-speed packet switching protocol used for wide area networks (WANs); faster than traditional X.25 networks, because it was designed for today's reliable circuits and performs less rigorous error detection. Frame relay networks use bandwidth only when there is traffic to send. Frame relay does not support voice.

framing

A technique which separates incoming bits into identifiable groups to enable the receiving device to recognize and reconstruct them.

frame ground

A metallic layer acting as a shield, consisting of tape, braid, wire or sheath and surrounding insulated conductors in cable. It may be the metallic sheath of the cable or the metallic layer inside a nonmetallic sheath. It reduces stray electrical fields, prevents outside electrical interference, drains off current induced by lightning and provides for safety of personnel.

frequency

The number of repetitions per unit time of a complete waveform. The number of complete cycles per unit of time, usually expressed in Hz.

full bandwidth DTE loopback

A loopback test that loops back the signal at the multiplexer. See also **loopback**.

H**HDLC (High Level Data Link Control)**

Bit-oriented, data-link control protocol; any related control of data links by specified series of bits, rather than by control characters.

I**IP address**

A unique, 32-bit identifier for a TCP/IP host on a network. IP addresses are normally printed in dotted decimal form, such as

L**LBO (Line Build Out)**

An adjustable value used to tune the attenuation between the DSU/CSU card and the last repeater on the T1 circuit.

LED (Light emitting diode)

A device that accepts electrical signals and converts the energy to a light signal.

LOF (Loss of Frame)

Occurs when a received digital signal loses frame synchronization.

LOFC (Loss of Frame Count)

A count of declared Loss of Frame events (ESF framing only).

loopback

A diagnostic test in which the transmitted signal is returned to the sending device after passing through a data communications link or network. This allows a technician (or built-in diagnostic circuit) to compare the returned signal with the transmitted signal and get some sense of what's wrong.

LOS (Loss of Signal)

Occurs when an input signal is detected as all zeros for 176 bit times.

loss

A reduction in signal strength, expressed in decibels.

LSC (Loopback Select Code)

An indicator describing a DSU loopback characteristic. LSC is a minimum of 35 LSC bytes of S11101F1 with secondary channel.

LT (Local Test)

A data port signal to DSU/CSU.

M**mask**

Refer to subnet mask.

MIB (Management Information Base)

A structure that defines what is obtainable from a network device and what can be controlled. It has a directory listing the logical names of all information resources residing in the network and pertinent to the network's management. It is used to describe network management variables.

multiplexer

Any device that allows two or more users to share a common physical transmission medium. Employed in pairs, where each device performs both multiplexing of the multiple user inputs and demultiplexing of the channel back into the separate user data streams.

multiplexing

The combining of multiple data channels onto a single transmission medium. Typically, data streams are interleaved on a bit or byte basis (time division) or separated by different carrier frequencies (frequency division).

multidrop

A communications arrangement where multiple devices share a common transmission channel, though only one may transmit at a time.

N**NEBS**

A network Equipment Building Systems requirement. A standard issued by Bellcore that spells out central office standards for grounding, cabling and power.

network

An interconnection of computer systems, terminals, or data communications facilities.

NI (Network Interface)

The point of demarcation between the customer premises and the carrier's network, usually drawn at the network connector on the rear panel of the Quick Eagle Networks access device.

NRZ (Non-Return to Zero)

A binary encoding and transmission scheme where "ones" and "zeros" are represented by opposite, and alternating, high and low voltages.

NRZI (Non-Return to Zero Inverted)

A binary encoding technique that inverts the signal on a "one" and leaves the signal unchanged for a "zero," where a change in voltage state signals a "one" bit and the absence of a change denotes a "zero" bit value.

O**OOS (Out of Service)**

A digital network trouble signal.

OOF (Out of Frame)

An error checking scheme. An OOF occurs when two out of four consecutive framing bits are in error.

P**parity bit**

An additional, non-informational bit appended to a group of bits indicating that the number of "ones" in the bits group is odd or even.

parity check

A process of error checking using the parity bit.

polarity Any condition where there are two opposing charges, such as positive and negative.

port The physical point of access into a computer, network or other electronic device.

protocol A formal set of rules governing the format, timing, sequencing and error control of exchanged messages on a data network.

R

RD (Receive Data)
A data port signal.

receiver The receiver synchronizes the framing pattern, separates the frame bits from the payload data and monitors for frame errors in 64 kbps mode. It achieves frame synchronization within 5 milliseconds.

repeater Equipment that receives a pulse train, amplifies it, retimes it, and then reconstructs the signal for retransmission.

return to zero Method of transmitting binary information such that, after each encode bit, voltage returns to the zero level.

RI (Ring Indicator)
A data port signal.

RJ48S An 8-position keyed jack used to connect services that are covered under FCC Part 68 Rules, such as public switched digital service (PSDS), switched 56, 19.2 Kbps service, 64 Kbps service, and synchronous digital data with secondary channel.

RLSD Receive Line Signal Detect, a data port signal

RS232 A TIA/EIA standard for serial transmission.

RS232-C

An EIA specified physical interface, with associated electrical signaling, between data circuit terminating equipment (DCE) and data terminating equipment (DTE).

RS449

A common 37-position interface for data terminal equipment and data circuit terminating equipment employing serial binary data interchange. It is a balanced interface, based on unipolar digital signals, depending more on current flow than voltage, therefore supports greater distances than the RS-232 interface.

RTS (Request to Send)

A signal sent by DTE to DSU/CSU indicating DTE has data ready to transmit.

S**SCR (Serial Clock Receive)**

A unipolar clock from the DCE signal. A data port signal.

SCT (Serial Clock Transmit)

A unipolar clock from the DCE signal. A data port signal.

SCTE (Serial Clock Transmit External)

The clock signal is echoed from the DTE for the purpose of timing incoming data on long cable runs.

scrambler

A device or software program that encodes data for encryption. It distorts a voice or data conversation so that only another like device can figure out the content of the message.

SD (Send Data)

A signal from DTE to DSU/CSU.

secondary channel

A subchannel derived from the main channel. It does not carry data messages and is used for diagnostic or supervisory purposes.

serial transmission

A sequential transmission of bits constituting an entity of data over a data circuit.

SES (Severely Errored Second)

A second during which 320 or more CRC violations or OOF events have occurred (ESF framing only).

SG (Signal Ground)

A signal from DTE to DSU/CSU.

simplex current

One way transmission used by Telco to provide power to repeaters.

SLIP (Serial Line IP)

A TCP/IP protocol that allows IP packets to be transmitted over a serial link, such as a dial-up or private telephone line.

SMDS (Switched Multimegabit Data Service)

A fast-packet technology based on the connection-less data networking capability described in the IEEE 802.6 specification. The data format for SMDS is "cell oriented." SMDS does not support voice.

SNMP (Simple Network Management Protocol)

A widely-used network monitoring and control protocol. Data is passed from SNMP agents (hardware and/or software processes reporting activity in each network device, hub, router, bridge, etc.) to the workstation console used to oversee the network. The agents return information contained in a MIB (Management Information Base), which is a structure that defines what is obtainable from the device and what can be controlled.

stop bit

The last transmitted element in each character, which permits the receiver to come to an idle condition before accepting another character.

subnet mask

The number of bits in an IP address used for the subnet address.

synchronous transmission

Data communications in which characters or bits are sent at a fixed rate and the transmitting and receiving devices are synchronized.

T**T1**

A digital carrier facility used to transmit a DS-1 formatted digital signal at 1.544 Mbps. T-1 normally can handle 24 voice conversations, each one digitized at 64kbps. But, with more advanced digital voice encoding techniques, it can handle more voice channels. T-1 is a standard for digital transmission in North America. T-1 lines are used for connecting networks across remote distances.

T3

A digital carrier facility used to transmit a DS-3 formatted digital signal at 44.736 Mbps.



T-Carrier

A time-division, multiplexed digital transmission facility, usually operating at an aggregate data rate of 1.544 Mbps.

telnet

A remote terminal application that enables you to log on to a remote computer on the same IP network. You can work from the PC as if it were a terminal attached by a hard-wired line to the remote computer. The application uses the *Telnet* Internet protocol.

transmitter

In 64K mode, the transmitter inserts the frame bit, with a fixed pattern of 101100.

TRAP

A mechanism by which a device automatically sends an alarm for certain network events to a management station. The management station can initiate a polling sequence to the device to determine the cause of the problem.

U**UAS (Unavailable Seconds)**

Number of seconds elapsed after 10 consecutive SES events are received (ESF framing only).

V**V.35**

A CCITT standard for the trunk interface between a network access device and a packet network. It defines signaling for data rates greater than 19.2 Kbps.

V.52

Terminal emulation standard. CCITT standard (1976) for various loopback tests that can be incorporated into modems for testing the telephone circuit and isolating transmission problems. Operating modes include local and remote digital loopback and local and remote analog loopback.

V.54

A CCITT standard for loop test devices in modems. It defines local and remote loopbacks.



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